MAR 13 1956 B 581844

MARCH, 1956

METAL FINISHING

DEVOTED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS

FOUNDED 1903

MAR 26 1956

Silver Plating Beryllium Copper
Practical Procedures to Solve Common Problems

Excess Job Shop Costs
Recorded, Controlled and Reduced

Some Tips on Electroforming
Fabrication by Means of Deposition

The Capacity of Hexagonal Barrels
Estimation of Efficient Loads

Boric Acid Analysis in Nickel Solutions
A New, Accurate Analytical Method

Finishing Pointers
Alkaline Tin Plating with Steel Anodes

Science for Electroplaters
Ionization of Water

Complete Contents Page 45

WHERE PLATERS AND FINISHERS LOOK FOR INFORMATION
WESTWOOD, N. J.
FINISHING PUBLICATIONS, INC.

READ & PASS ON

LIBRARY OF CLEPO SERVICE

1. to produce chemicals that will do the work fast and thoroughly and without damage to the metal surface.

2. to assure that this work, some of it non-productive, can be done economically.

At the left are listed two objectives that always concern our technical staff when it is working on cleaner and stripper formulations.

On strippers, in particular, we keep well in mind that an appreciable cost has already gone into the work. Reclamation just can't carry a high cost. Nor should it damage the work.

CLEPO Products meet these severe requirements.

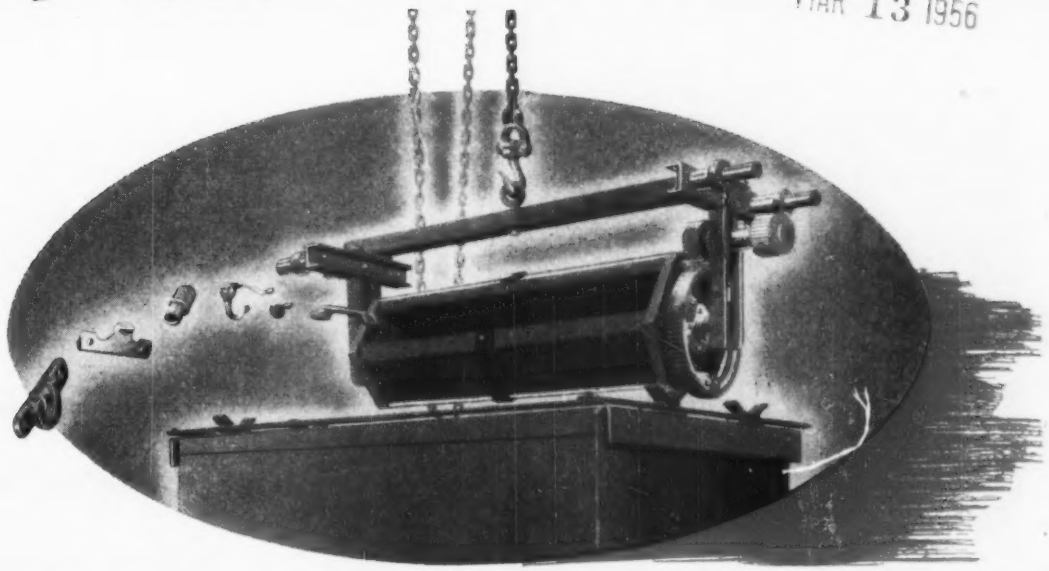
We could list several CLEPO Formulations that will do an excellent cleaning or stripping job but it wouldn't begin to cover our line. Why not tell us about your requirements and then have our field service man call and outline the best chemicals and procedure? We are confident that with you it will be 'once CLEPO always CLEPO'. . because you will get good results fast and at low cost.

FREDERICK GUMM Chemical Company Inc.

538 FOREST STREET, KEARNY, N.J.

B 581844

MAR 13 1956



Plating on Aluminum made EASY with Alumon

Hundreds of manufacturers throughout the United States are now using electroplated aluminum. The Alumon process is simple. The work is merely cleaned, dipped in acid, dipped in Alumon and is then ready for electroplating with copper, nickel, and other metals. The process is suitable for plating most wrought and cast alloys. . . The cost of using Alumon is low, being less than half a cent per square foot of surface area treated. The process can be fitted easily into regular plating cycles. Bulk or barrel plating readily done. Upon request we'll gladly send you the Alumon Process Bulletin.

Write for literature on Alumon and check list of literature on sixty Enthone products and processes for better metal finishing.

*TRADE-MARK REG. U. S. PAT. OFF. MANUFACTURED UNDER U. S. PATENT 2,142,564.

METAL FINISHING PROCESSES

ENTHONE
INCORPORATED
442 ELM STREET
NEW HAVEN, CONNECTICUT

ELECTROPLATING CHEMICALS

May I put my head in your finishing barrel?
OAKITE PRODUCTS, INC.
Rector Street, New York 6, N. Y.
Technical Service Representatives in Principal Cities of U.S. & Canada

THE MORE KNOW-HOW YOU PUT IN THE BARREL, THE MORE PROFIT YOU TAKE OUT

Useful facts gathered during Oakite's years of experience in barrel finishing are packed like #12 stones in this 10-page booklet covering such subjects as:

PRECLEANING—Good tank cleaning; Good barrel cleaning; Good rinsing saves money.

CUTTING DOWN, DEBURRING—Good solutions; Abrasive media, water and work ratios, etc.

PICKLING, DESCALING, BRIGHT DIPPING—Good solutions for steel, brass, aluminum, etc.

BURNISHING—Good solutions; Burnishing media, water and work ratios, etc.; How to overcome water hardness; How to keep barrels and media clean; How to prevent rusting, tarnishing and other corrosion.

FREE... For your copy of *"May I put my head in your finishing barrel?"* just write or mail the coupon.

OAKITE PRODUCTS, INC.
26 Rector St., New York 6, N. Y.

Send me a FREE copy of your booklet on Barrel Finishing.

Name_____

Company_____

Address_____

_____

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
REG. U.S. PAT. OFF.
MATERIALS • METHODS • SERVICE

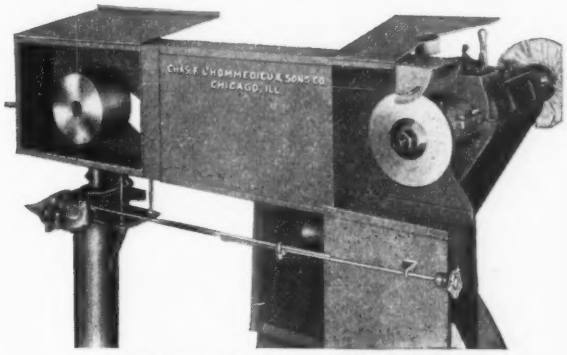
Technical Service Representatives Located in Principal Cities of United States and Canada

Metal Finishing is published monthly by the Finishing Publications, Inc., 381 Broadway, Westwood, New Jersey, U.S.A.
Entered as second class matter at the Post Office in Westwood, N. J. Volume 54, No. 3, March, 1956. Four Dollars Per Year.

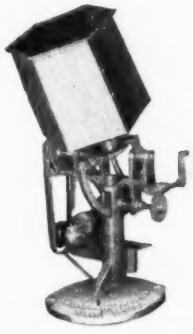
USE "RELIANCE" PRODUCTS FOR

ECONOMY : EFFICIENCY : DEPENDABILITY

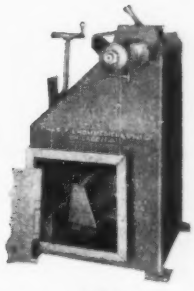
WRITE FOR FURTHER DETAILS



BACKSTAND IDLER WITH LATHE

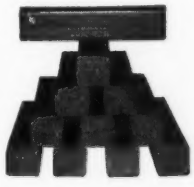


OBLIQUE
TUMBLING BARREL



#23A
POLISHING LATHE

BACKSTAND IDLER



EXTRUDED COMPOSITIONS
STANDARD SIZE
2 x 2 x 10"

NUWAY BUFFS FOR
FAST CUTTING

Chas. F. L'Hommedieu & Sons Co.

MANUFACTURERS of

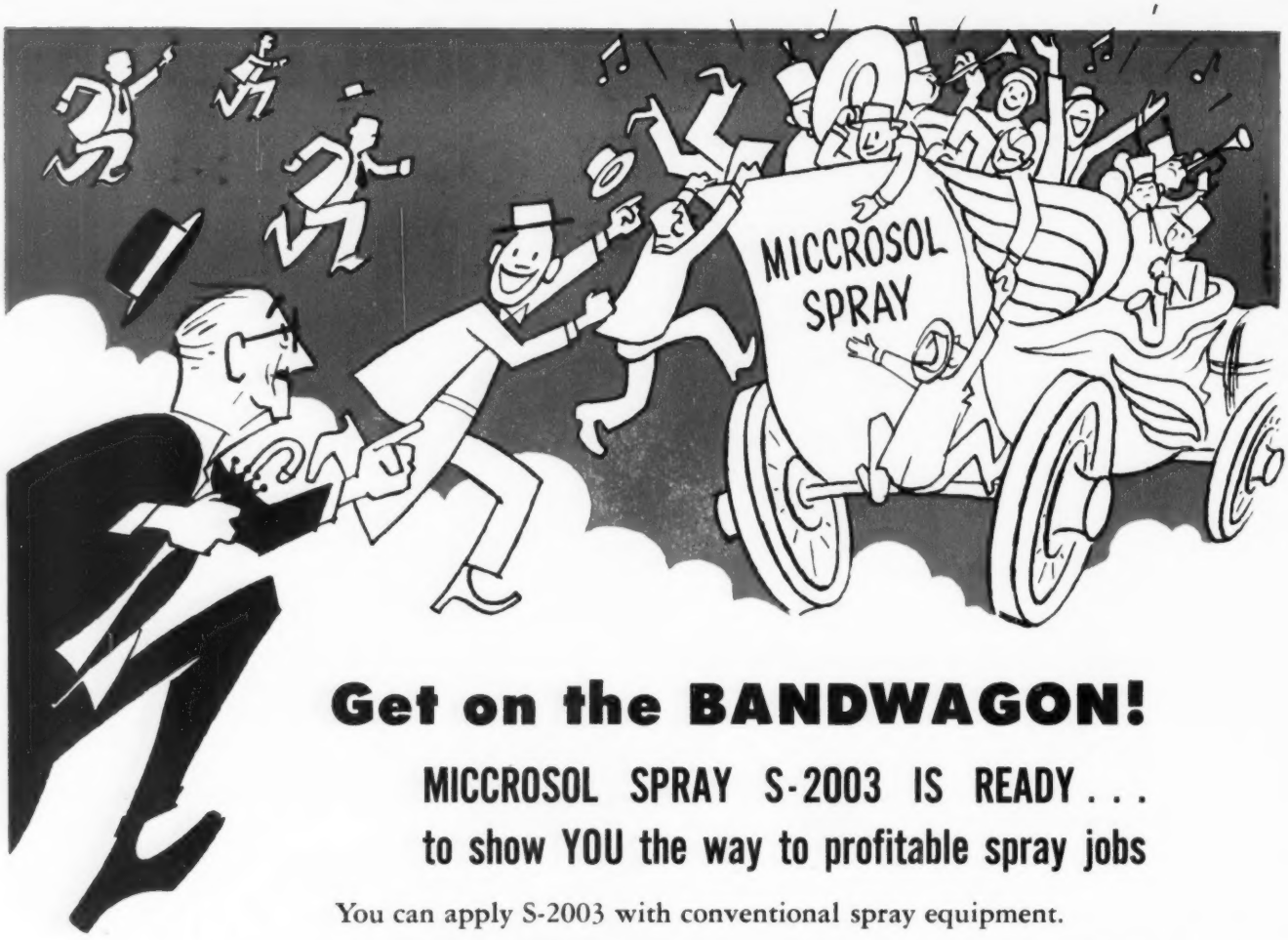
Plating and Polishing Machinery

Complete Plating Plants Installed

C. B. Little
Newark, N. J.
W. R. Shields
Detroit, Mich.
Powell Calvert
104 Second Street
Feasterville, Pa.

Gen. Office and Factory:
4521 Ogden Ave.
CHICAGO

Branches:
Cleveland
and
Los Angeles



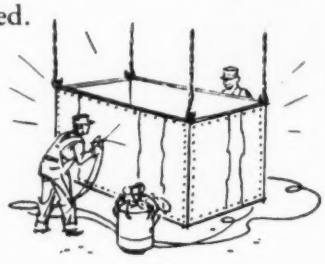
Get on the BANDWAGON!

MICCROSOL SPRAY S-2003 IS READY . . . to show YOU the way to profitable spray jobs

You can apply S-2003 with conventional spray equipment.

You can apply 60 mils thickness in one application without sagging of material. If multiple coats are required, a short cure time is all that's needed between applications. A contrasting color can serve for layer identification, if desired.

Tanks
Ducts
and other
Equipment



You can use S-2003 in all plating baths. It has the same toughness—chemical, corrosion, and abrasion resistance as Miccrosol E-1003. Our adhesive systems provide outstanding adhesion to metal surfaces.

Solvent additives are not necessary. S-2003 is 100% solids and is sprayed as received. Time consuming and expensive adjustments are unnecessary. Problems of material instability and film cracking are eliminated. There is no solvent loss and less operator fatigue with Miccrosol Spray S-2003.

It's the ideal plastisol for spray applications.

IT'S TOPS!

• WRITE FOR PARTICULARS ON COMPANY LETTERHEAD

Developed and manufactured by experienced platers

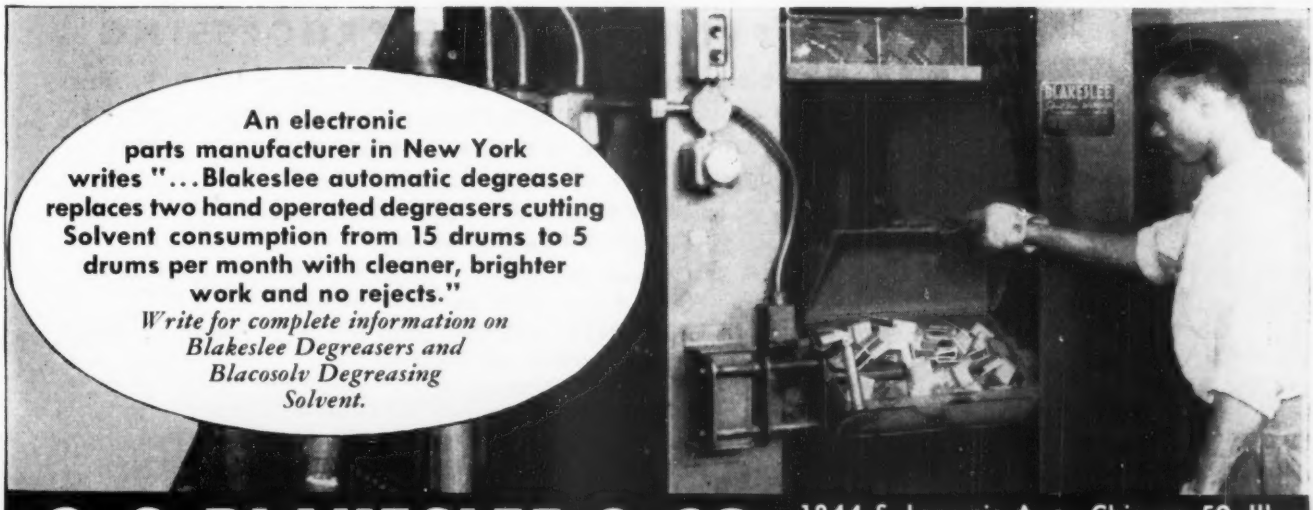
MICHIGAN CHROME *and Chemical Company*

8615 Grinnell Avenue • Detroit 13, Michigan

SOLVENT CONSUMPTION CUT FROM 15 ....to 5 DRUMS

with BLAKESLEE

AUTOMATIC SOLVENT VAPOR DEGREASER



An electronic parts manufacturer in New York writes "...Blakeslee automatic degreaser replaces two hand operated degreasers cutting Solvent consumption from 15 drums to 5 drums per month with cleaner, brighter work and no rejects."

Write for complete information on Blakeslee Degreasers and Blacosolv Degreasing Solvent.

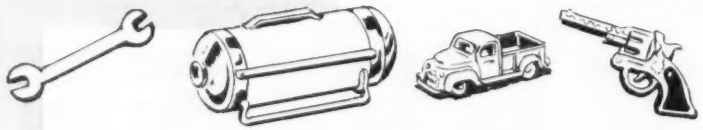
G. S. BLAKESLEE & CO. 1844 S. Laramie Ave., Chicago 50, Ill.
New York • Los Angeles • Toronto

Also Manufacturers of Blakeslee Metal Washing and Surface Treatment Machines

Now as bright as the twinkle in a small boys eyes...

New PROBRITE* BY PROMAT

gives the luster and protection you want in decorative finishes...



Tools, tubular furniture, household appliances and toys are a few applications where chromium plated PROBRITE is used to advantage as a new, durable bright finish.

IMPROVED, NEW PROCESSING

by Promat's research staff has created a completely new, improved alloy which gives the manufacturer of tools, of tubular furniture, of household appliances and of toys, these tremendous advantages:

1. PROBRITE can be plated full bright!
2. PROBRITE can be buffed!
3. Chromium plated PROBRITE sealed in Proseal S-30-A prevents corrosive attack.
4. PROBRITE protects and has the luster of the finest decorative finishes!

*

For more information about this amazing new product write for Bulletin 7 - 3 or send a sample of your product to be plated for your evaluation.

"PROMAT MEANS PROTECTIVE MATERIALS"

PROMAT DIVISION - POOR & COMPANY

151 SOUTH MARKET STREET DEPT. MF-3 WAUKEGAN, ILLINOIS

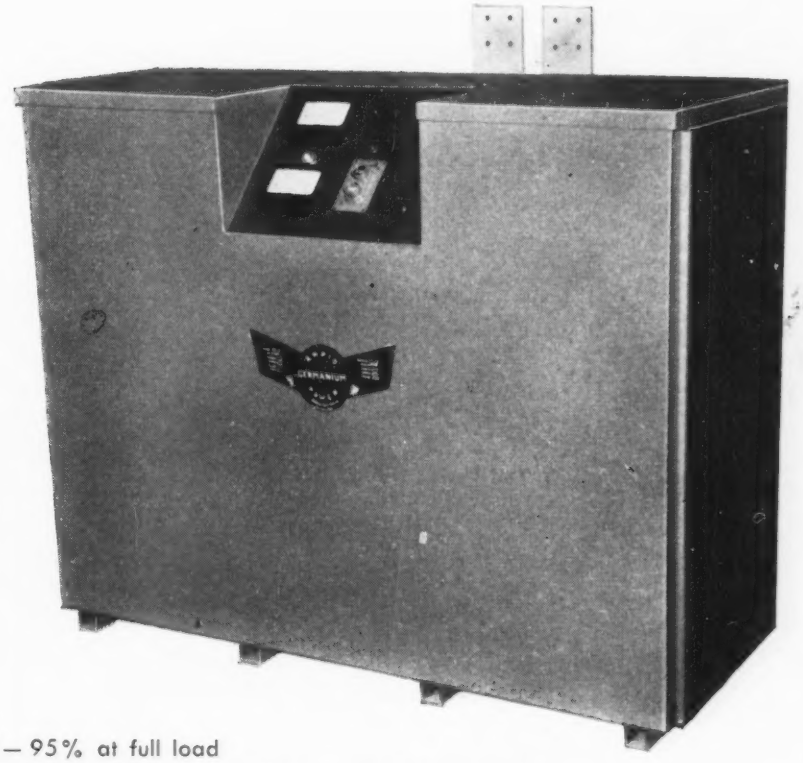
MANUFACTURING PLANTS

PHILADELPHIA, PA. — WAUKEGAN, ILL. — GARDENA, CALIF.

The Power Supply of Tomorrow—Here Today

RAPID GERMANIUM RECTIFIERS

EFFICIENT • COMPACT • SEALED JUNCTIONS • LONG LIVED



The features of new Rapid GERMANIUM Rectifiers are proving to be the answer to many of the plating industry's power problems. More than any other DC power supply, Rapid GERMANIUM Rectifiers answer the need for —

EFFICIENCY — 95% at full load

VOLTAGE STABILIZATION — ±1 volt from no load to full load

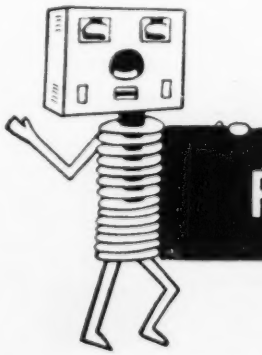
COMPACTNESS — require much less space than conventional units

SEALED JUNCTIONS — corrosion is kept out

PRECISE CONTROLS — oil immersed, fully motorized Inductrol controls, provide continuously variable control at the touch of a button

LONG-LIFE — no aging or change in characteristics even after accelerated full load tests

Find out more about RAPID GERMANIUM RECTIFIERS, "the power supplies of tomorrow — here today". Write to Rapid Electric Co., 2881 Middletown Road, New York 61, New York. Ask for Bulletin G-5.



THE NAME THAT MEANS *"More Power to You!"*

RAPID ELECTRIC COMPANY

MUTUAL

*"Symbols YOU CAN RELY ON"

CHEMICAL PROGRESS WEEK-APRIL 23-28

The karat number is the hallmark of quality on any article made of gold. In addition to signifying the guaranteed gold content, it is also a symbol of the reliability of the manufacturer.

The Mutual trademark on shipments of Chromium Chemicals is likewise a mark of quality and reliability. Mutual has always taken pride in its reputation for producing chemicals which meet rigid specifications and for supplying the needs of its customers.

Chromic Acid • Sodium Bichromate • Potassium Bichromate

MUTUAL CHEMICAL DIVISION

MUTUAL — ALLIED CHEMICAL & DYE CORPORATION

99 PARK AVENUE • NEW YORK 16, N. Y.

Allied Chemical

ALUMINUM FINISHES

THE FINISHING TOUCH

by A. B. HOEFER
vice president
FREDERIC B. STEVENS, INC.

Will Anodized Aluminum Replace Nickel-Chrome Finishes?

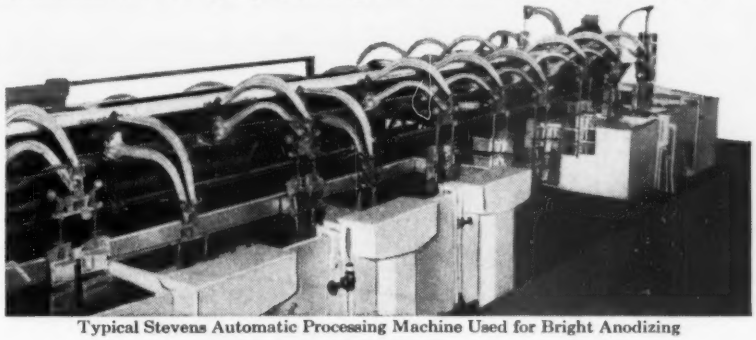
Affirmative answers to this question are revealed in several current business publications and our own sales figures.

Speeding the change is the continued tight supply of nickel. Manufacturers have been forced to look for substitutes for nickel and like the results anodized aluminum have given them.

A trend is developing. Volume of Stevens Automatic anodizing equipment sold in 1955 was nearly double the volume for the two preceding years. At the same time, sales of Stevens compositions used in buffing and polishing aluminum were showing a 50% increase.

Frederic B. Stevens, Inc., manufacture equipment for both nickel-chrome and aluminum finishes. We believe both types of finishes will increase in demand but at the moment the interest in aluminum is high.

If you are considering aluminum for your product, you can be assured that aluminum parts can be bright anodized and finished to compare favorably with the fine finish of chrome plate. In addition, aluminum can be dyed, resulting in non-fading colored finishes.



Typical Stevens Automatic Processing Machine Used for Bright Anodizing

Stevens aluminum anodizing equipment is presently being used and recommended in the finishing of colored anodized tumblers, utensils, refrigerator components, rivets, automotive trim, lighting reflectors, etc.

Stevens' experience in furnishing complete anodizing equipment installations assures you of the latest techniques—the finest finishes—at the lowest costs.

For long range planning consider the versatility of Stevens Automatic equipment. Changes of cycles or processes can be accomplished quickly and inexpensively. Your Stevens Automatic Processing Machine for anodizing can be changed to a nickel-chrome cycle at a later date.

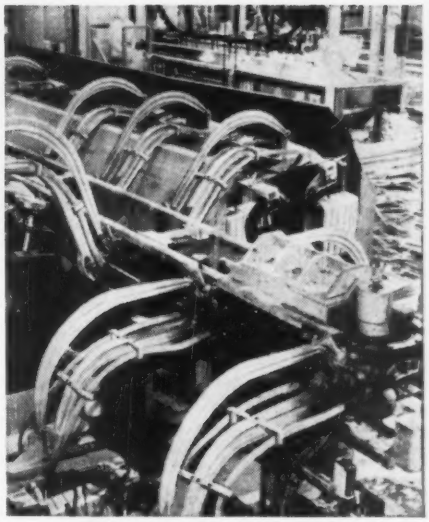
If your design engineers are talking of aluminum to add sales appeal excitement, cost reducing features to your new product lines, let us discuss your requirements with you.

For further information write to Frederic B. Stevens, Inc., Detroit 16, Michigan.

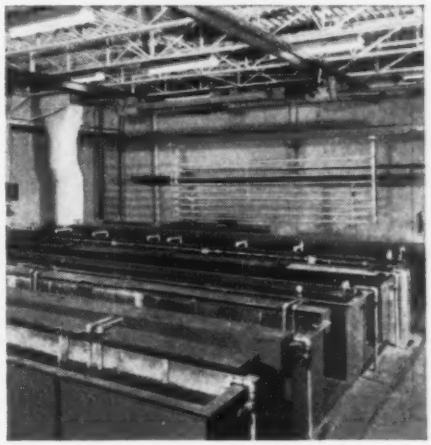
FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

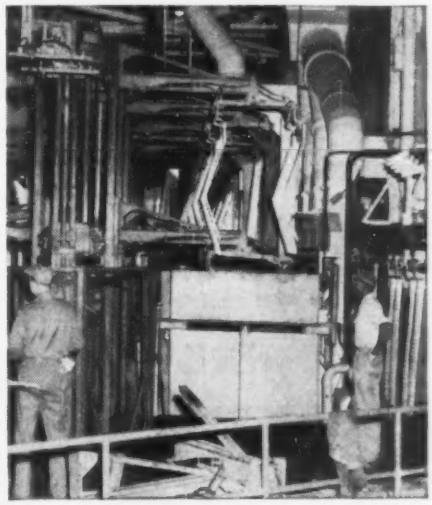
BRANCHES:
Buffalo • Cleveland • Indianapolis • New Haven



Stevens Model "B" Automatic Processing Equipment used in anodizing refrigerator evaporators.



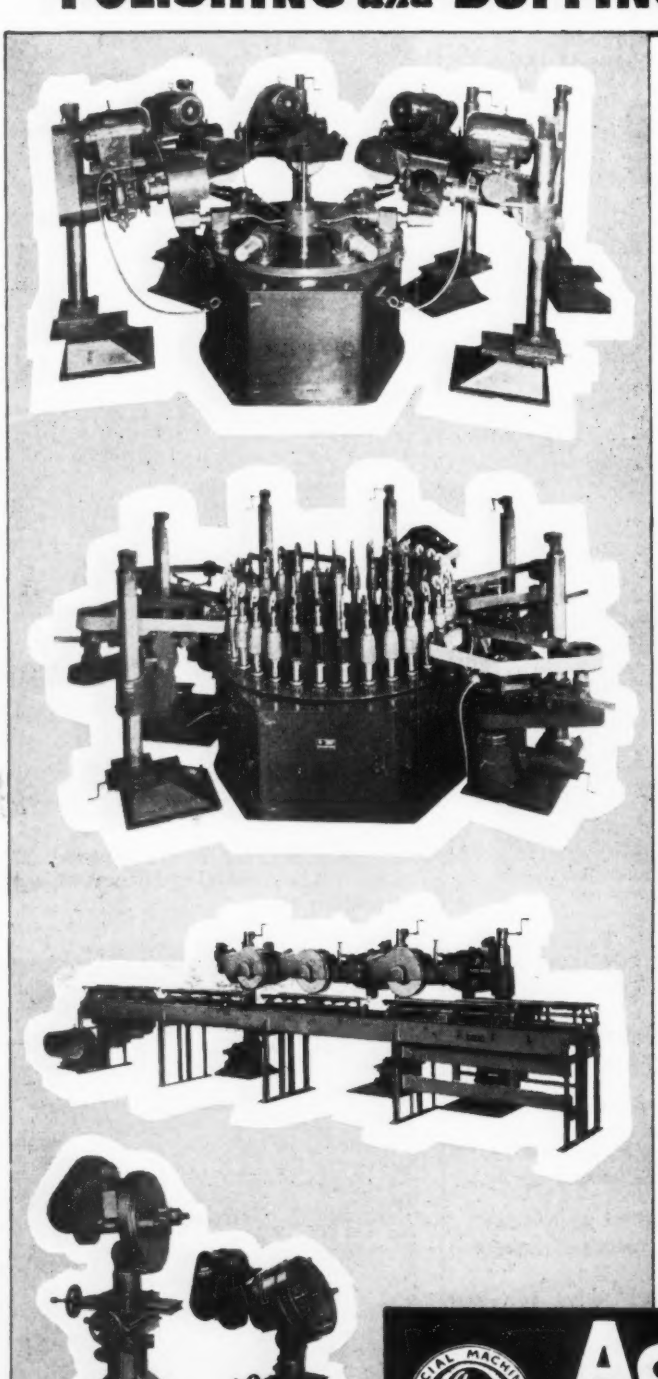
Stevens Still Tank installation for anodizing extruded architectural and aircraft parts.



Automatic "Stevadoer" used in anodizing grille sections for leading automotive manufacturer.

ACME *Automatic*
POLISHING *and* BUFFING MACHINES

are engineered for low cost, high production finishing...



- For Polishing and Buffing, De-burring, Wire Brushing and Micro-finishing
- Rotary *Automatics* Straightline *Automatics* *Semi-Automatics*
- Backed by half a century of specialized experience and progressive development
- Proved performance and dependability in industry

RECOMMENDATIONS and QUOTATIONS

• We will be pleased to receive blue prints or preferably finished and unfinished samples of the part you contemplate finishing together with detailed information on present finishing operation and production requirements. On receipt of samples and data we will offer recommendations and quotations.

SPECIAL MACHINERY — AMC — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR NEARLY HALF A CENTURY

CATALOGS ON REQUEST

NEW!
DIFFERENT!
--but Production Proven

These three numbers are available in new, longer, "nubbin saving" containers. They are manufactured up to 100% saponifiable, resulting in easier cleaning, quicker acting and cost cutting compositions for you. Try these new time savers now, Mr. Polishing and Buffing Superintendent.

Call collect or write for your free samples and prices pronto!

Clip To Your Letterhead

ROsewood 1-9902

Schaffner
manufacturing company, inc.
SCHAFFNER CENTER, EMSWORTH, PITTSBURGH 2, PA.

Please send me more detailed information about your new buffing compounds. I would also like to have your free sample(s) of
☐ LIME ☐ GREASE STICK ☐ STAINLESS

Name _____

Title _____

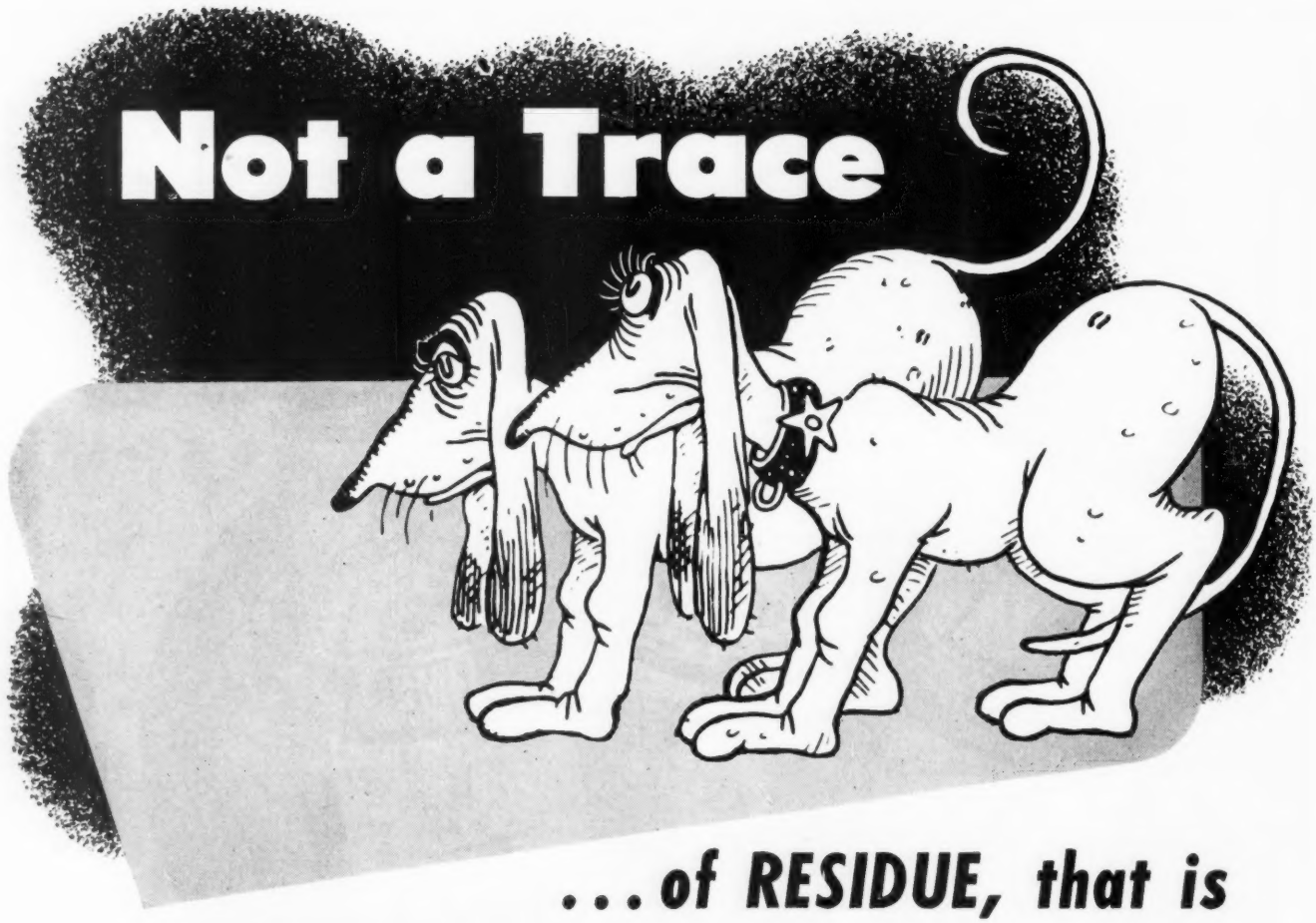
Company _____

Street _____

City _____ Zone _ State ____

Schaffner
manufacturing company, inc.
EMSWORTH, PITTSBURGH 2, PA.

Not a Trace



. . . of RESIDUE, that is with NEW AHCO Burnishing Compounds

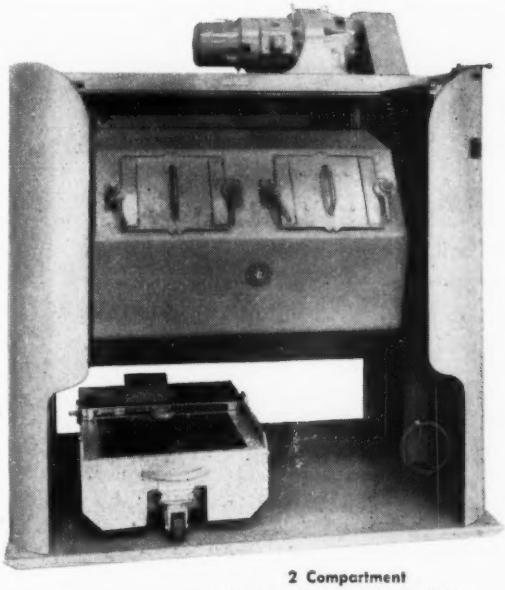
Residue vanishes in a water rinse . . . burnished surfaces are left clean, bright, and film-free, but it's no mystery because this new series of AHCO Burnishing Compounds is formulated only from non-saponaceous materials that contain the last word in surface-active agents. These compounds are free-flowing, dry, non-toxic, and non-corrosive powders which are, of course, freely soluble in water. They're prepared especially for applications where the sticky residues from soap-like mixtures are objectionable. For rolling and burnishing before plating, AHCO burnishing Compounds assure excellent adhesion and maximum lustre. For preparing surfaces before lacquering, painting or other processing . . . for burnishing plated parts to remove plating compound residues, that would cause staining or spotting, there are AHCO Burnishing Compounds made to order. Find out *now* how one or more of the many new AHCO Burnishing Compounds can do that better job in your plating or finishing room.

For full details about AHCO Burnishing Compounds write today for Bulletin B-10 to Apothecaries Hall Co., 22 Benedict Street, Waterbury, Connecticut.

Apothecaries Hall Co.

APOTHECARIES HALL COMPANY
WATERBURY CONNECTICUT
1849

CROWN TUMBLE
DEBURRING EQUIPMENT

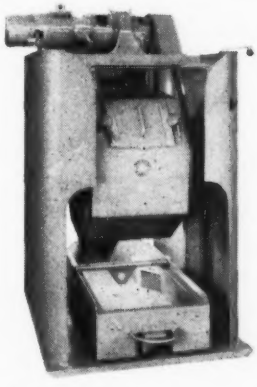


2 Compartment
Horizontal Tumbling Machine

To deburr and tumble finish metal parts

Crown's complete line of newly improved tumbling machines and labor saving accessories provide huge savings in time-costs and labor.

- Light weight — quick acting "seal tite" doors with easily replaceable gasket.
- Front safety guard.
- Forward and reverse switch to rock barrel in rinsing and to position doors for loading and unloading.
- Easily accessible motor and bearings.
- Rubber lined — Neoprene lined — unlined.
- Special machines designed and built



Single Compartment
Horizontal Tumbling Machine

Mechanical Separating Table
Hoist Pan Type

Separating Table
Hand Type

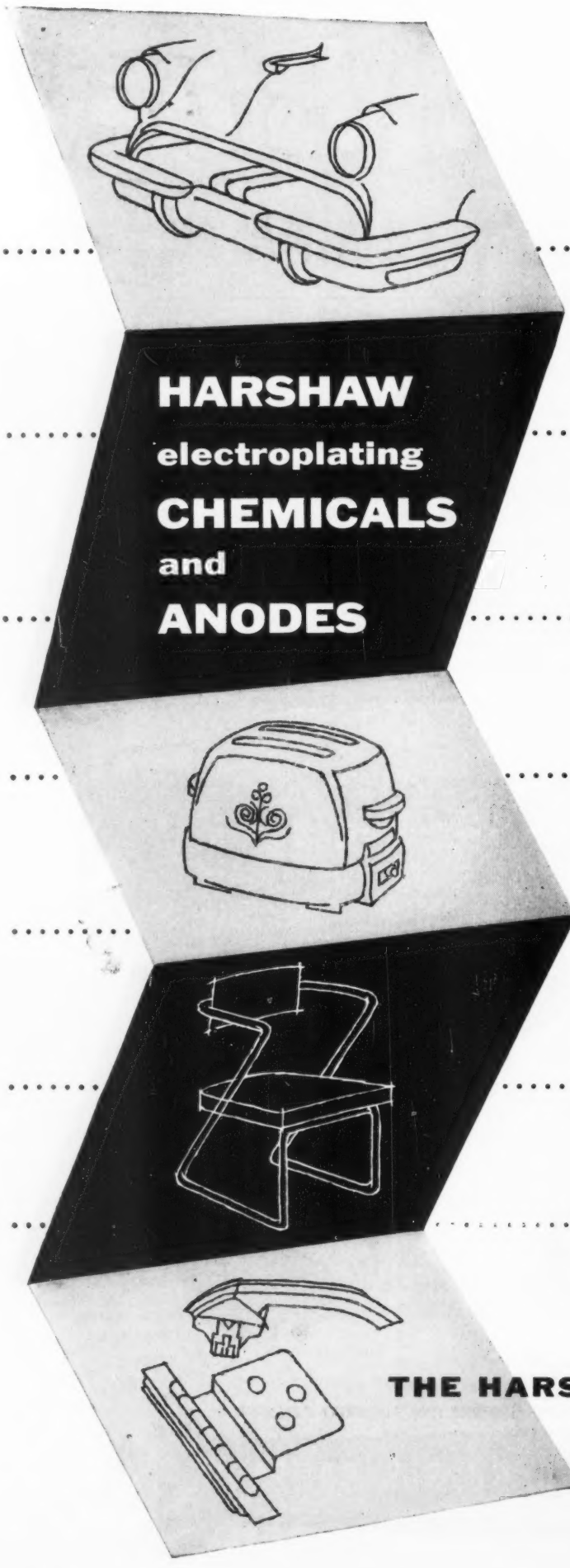
Separator — Motor Drive
with Hopper

Chip or Tumbling
Abrasive Bin

WRITE FOR OUR COMPLETE CATALOG OF TUMBLING MACHINES AND ACCESSORY EQUIPMENT

CROWN RHEOSTAT AND SUPPLY COMPANY

3465 N. KIMBALL AVENUE • CHICAGO 18, ILLINOIS



HARSHAW electroplating CHEMICALS and ANODES

nickel plating

... still and barrel ... nickel anodes—all commercial grades and sizes ... anode bags ... single nickel salts—nickel chloride ... nickel carbonate ... nickel fluoborate ... boric acid.

chromium plating

... pure "Krome Flake" 99.8% CrO_3 ... sulphates less than .10% ... lead, tin-lead and antimony-lead anodes.

copper plating

... copper ball anodes ... Rochelle Salts ... sodium and copper cyanides ... copper sulfate ... copper fluoborate.

cadmium plating

... ball and cast cadmium anodes ... cadmium oxide ... sodium cyanide ... cadmium fluoborate.

tin plating

... cast tin anodes ... sodium stannate ... stannous sulfate ... tin fluoborate ... acid tin addition agent.

zinc plating

... ball and cast zinc anodes ... sodium and zinc cyanide ... zinc sulfate ... zinc fluoborate.

lead plating

... cast lead anodes ... lead fluoborate.

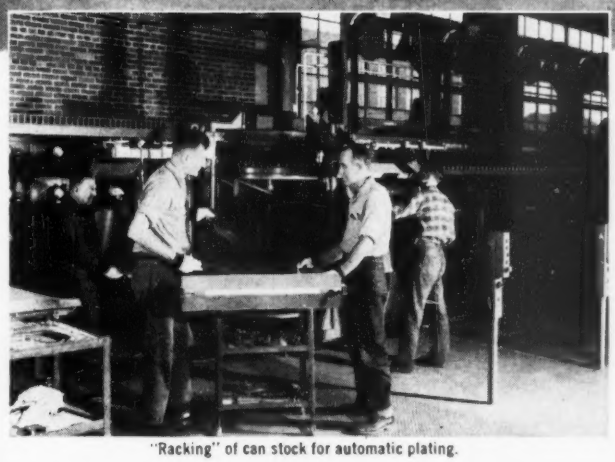
silver plating

... silver cyanide.

THE HARSHAW CHEMICAL COMPANY

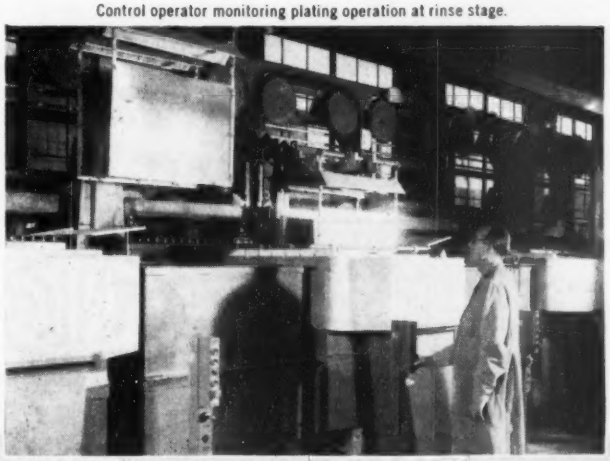
Cleveland 6, Ohio

Chicago 10, Ill. • Cincinnati 13, Ohio • Detroit 28, Mich.
Houston 11, Texas • Los Angeles 22, Calif. • Philadelphia 48, Pa.
Pittsburgh 22, Pa. • New York 17, N. Y.



"Racking" of can stock for automatic plating.

Control operator monitoring plating operation at rinse stage.



Engineered and Manufactured by

LASALCO, INC.

For International Nickel Co. Bayonne, N. J.

For the first time this exclusive installation makes possible the testing of new plating processes and metallic coatings under conditions similar to those in actual plating plants. Fully automatic, this precision-controlled plating line can produce metal-coated test panels in large numbers with positive accuracy for forecasting results obtainable with any experimental or plating method.

Extreme flexibility is an outstanding feature. Thirteen different stations make possible cycle combinations from 1 to 13 stations with times of 5 seconds to several hours, even days, in any station. Also provides either single or double line operation for work up to 3 feet in cross section. Tanks can be simply moved in any sequence with a lift truck. A panel board controls time, current and voltage for each stage of a cycle. Power is supplied by a bank of 6 rectifiers, each rated 1000 amps at 12 volts, 2000 amps at 6 volts. Although designed for full automation, the line can be operated manually.

Again Lasalco demonstrates superior ability to find the *right* answer to *any* plating problem. Make it a rule to *always consult Lasalco first!*

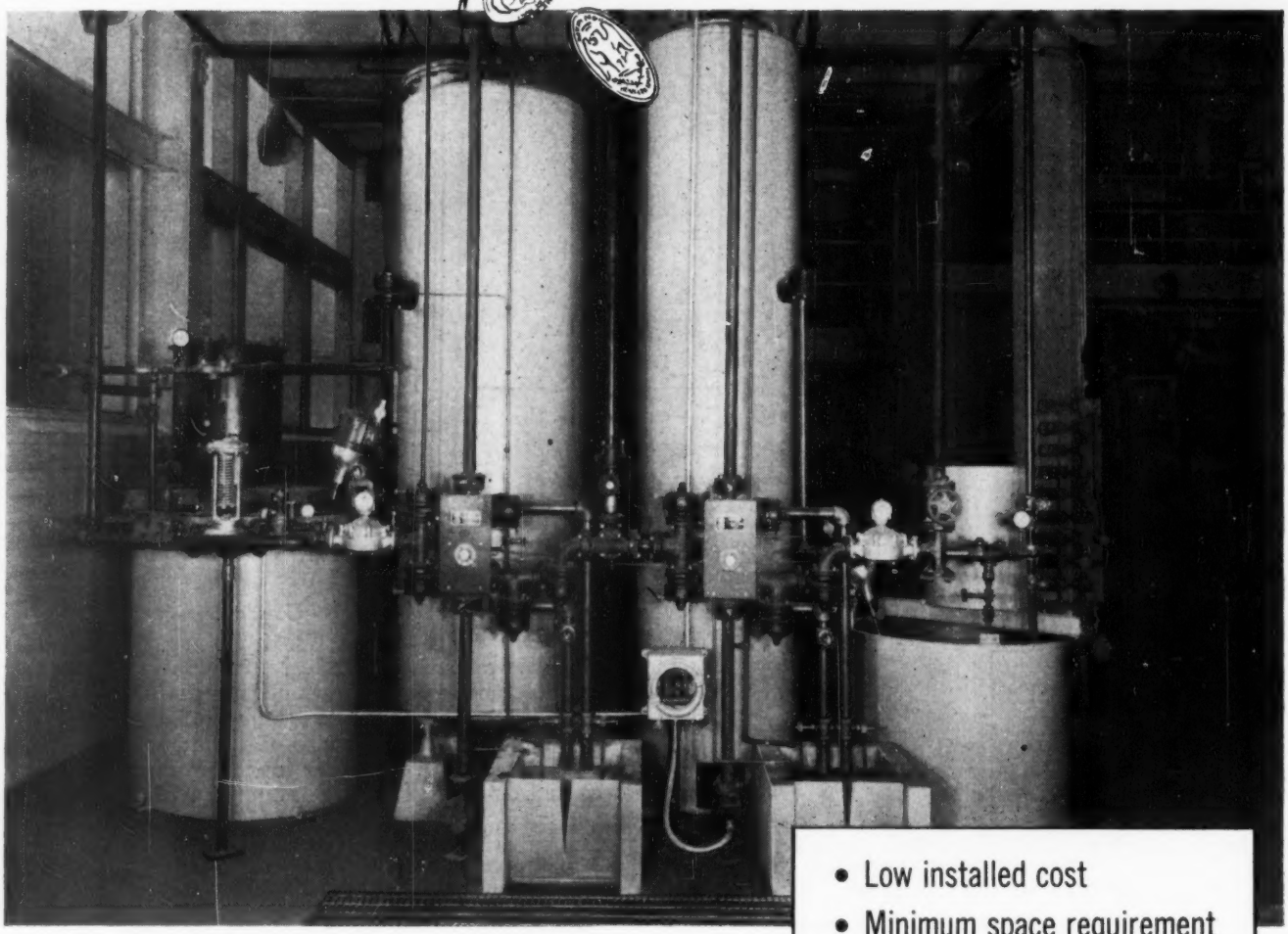
Photos courtesy International Nickel Co., Inc.

HOME OFFICE
2820 LaSalle St.
St. Louis 4, Mo.
PRospect 1-2990

LASALCO, INC.
EQUIPMENT, CHEMICALS AND SUPPLIES FOR
ELECTROPLATING, ANODIZING AND POLISHING

IN TEXAS
1113 Perry Road
Irving (Dallas), Tex.
BLackburn 3-4921

There's Money In Your Plating Wastes!



Typical CATEXER® ANEXER® Ion Exchange Plant

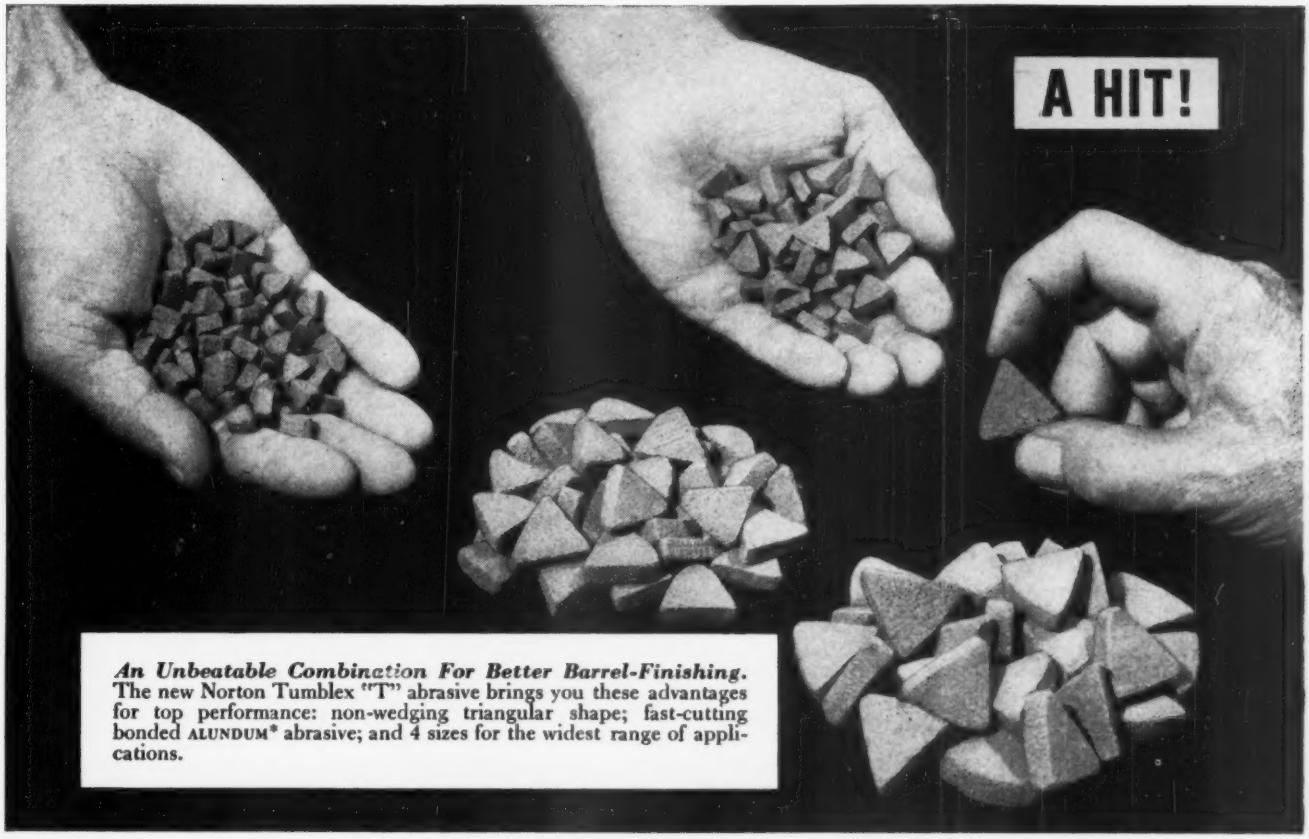
- Low installed cost
- Minimum space requirement
- Chemical recovery
- Demineralized rinse water
- Simplified waste disposal

New ion exchange techniques using "CATEXER" "ANEXER" plants make it practical to recover valuable chemicals and rinse waters in some cases. Only careful evaluation will show whether recovery methods, or treatment by oxidation, reduction or precipitation is more economical. INFILCO manufactures all types of waste treatment equipment and can offer impartial evaluation of your problem. Write for complete information.

INFILCO

The one company offering engineered equipment for all types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

INFILCO INC. 912 South Campbell Ave., Tucson, Arizona
Offices in principal cities in North America 5539



An Unbeatable Combination For Better Barrel-Finishing. The new Norton Tumblex "T" abrasive brings you these advantages for top performance: non-wedging triangular shape; fast-cutting bonded ALUNDUM* abrasive; and 4 sizes for the widest range of applications.

Users praise Norton TUMBLEX "T"

the new bonded, triangular tumbling abrasive

Reports prove Tumblex "T" abrasive brings many new

"TOUCH of GOLD" *benefits to barrel-finishing*

Here's one of the most revolutionary barrel-finishing innovations ever developed. In typical on-the-job tests, Norton customers report that the new Tumblex "T" tumbling abrasive:

- ***"cuts tumbling cycle time from five hours to one hour."***
- ***"finishes steel and magnesium parts that could never before be barrel-finished."***
- ***"completely removes burrs from stainless steel parts in four hours. Abrasives previously used failed to do so in 12 hours."***

Everything about Tumblex "T" abrasive is designed for better barrel-finishing.

Its uniform triangular shape and size prevents wedging in recesses of parts.

Made of famous Norton ALUNDUM abrasive, it cuts fast, with no compound needed — resulting in shorter time cycles and lower costs per piece finished.

It provides maximum surface contact with parts being processed, assuring top quality work in fastest time.

It wears down evenly, keeping the same triangular shape. No small chips to lodge in holes, slots, etc. — and when worn down it can be used on parts requiring a smaller size abrasive.

Its lightness means less weight required to fill the barrel. Results are more uniform finish, without roll-in or roll-over of edges of parts.

Its chemical inertness, unaffected by acids, compounds or detergents, prevents spoilage common to other types of abrasive.

Send Your Work Samples

to our newly enlarged Sample Processing Department. Let us prove to you how the latest barrel-finishing equipment and techniques can improve your product quality and cut your finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. G-305

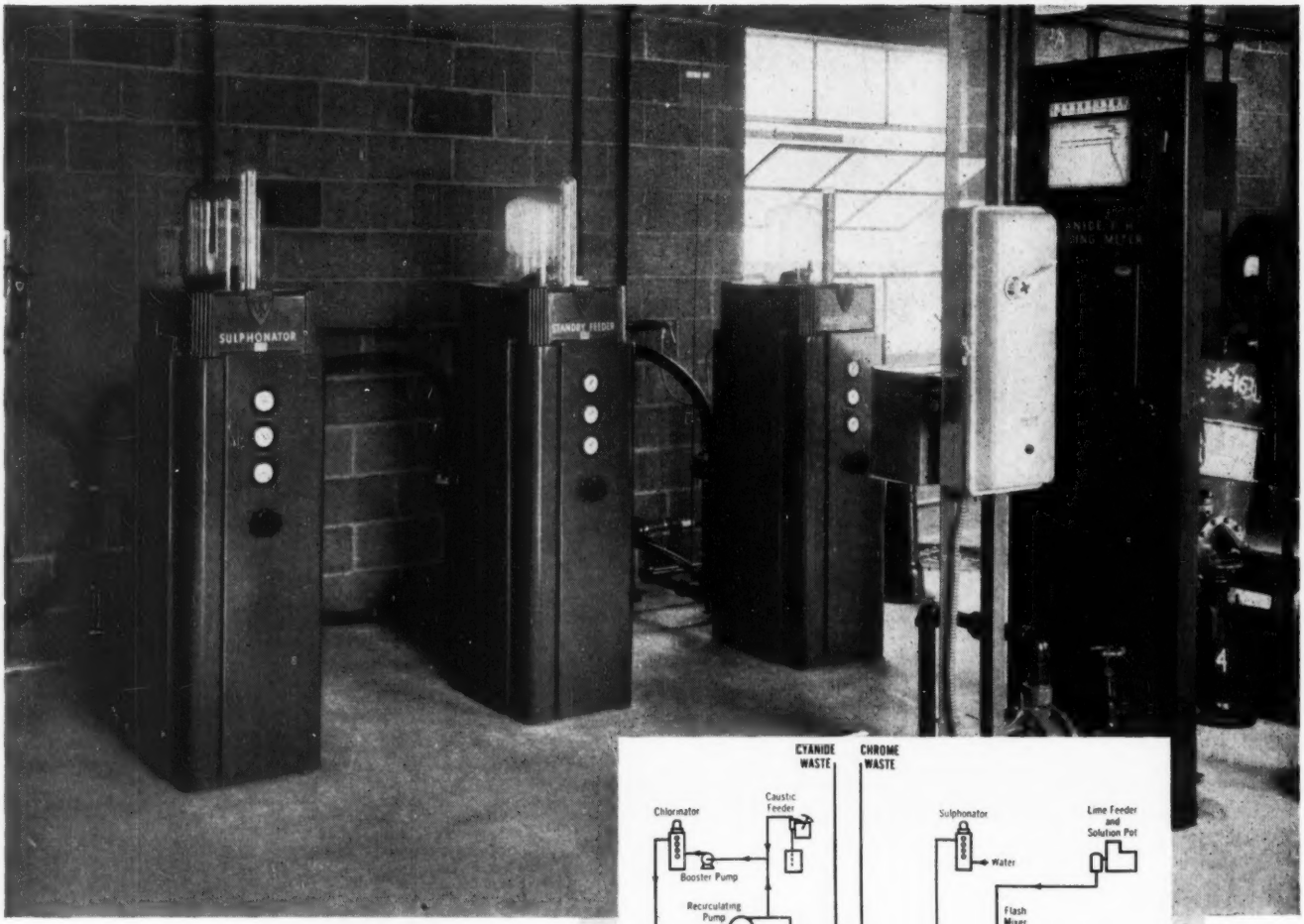
NORTON

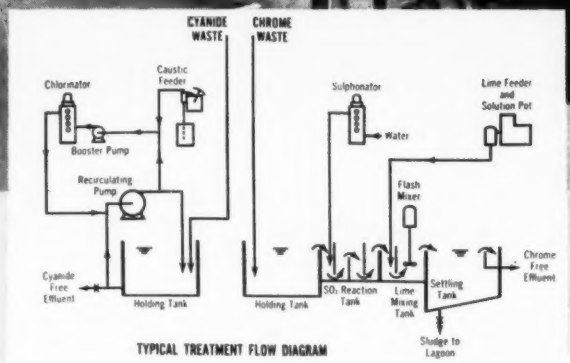
ABRASIVES

Making better products... to make your products better

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING Division: Coated Abrasives Sharpening Stones • Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries





TYPICAL TREATMENT FLOW DIAGRAM

DAYSTROM INSTRUMENT DIVISION USES

W&T *Cyanide & Chrome Waste Treatment*

The Daystrom Instrument Division of Daystrom, Incorporated, located at Archbald, Pennsylvania, has provided a compact and efficient treating plant to destroy the toxic components of their plating waste. The treatment plant has been in continuous operation since 1953.

The cyanide bearing waste is treated with chlorine and caustic, using a W&T Water Diaphragm Chlorinator and a W&T Chemical Solution Feeder. The treatment breaks down the cyanide to harmless carbon dioxide and nitrogen gas components.

The chromium bearing waste is treated with sulphur dioxide and lime, using a W&T Sulphonator and a W&T Dry Chemical Feeder. The treatment removes the toxic chromium and other heavy metals from solution, to be disposed of as sludge.

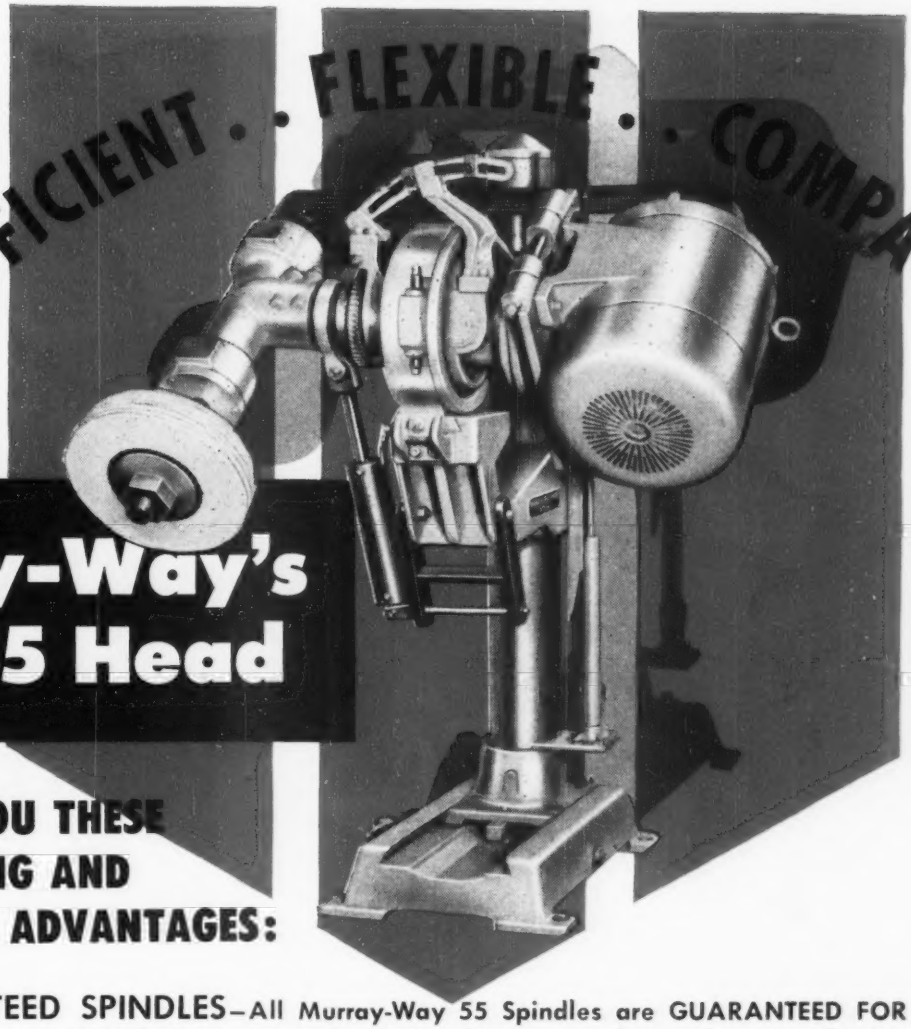
If you would like more information on Wallace & Tiernan cyanide or chromium waste treatment, write for bulletin RA-2120-CM.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

I-52

EFFICIENT . . FLEXIBLE . . COMPACT



Murray-Way's New #55 Head

GIVES YOU THESE POLISHING AND BUFFING ADVANTAGES:

GUARANTEED SPINDLES—All Murray-Way 55 Spindles are GUARANTEED FOR 3 YEARS. Factory-tested spindles incorporate heavy-duty, anti-friction bearings that require no grease or oil and are sealed against dirt for trouble free performance.

RIGHT OR LEFT HAND OPERATION—By simply inverting the head assembly, the 55 Heads may be used for either right or left hand operation.

SMALL FLOOR SPACE—The 55 Series Heads will install in line on 5′8″ centers. They conserve floor space, economize on conveyors, and reduce fixture requirements.

UNIVERSAL POSITIONING—With the Murray-Way adjustable fulcrum head, you get universal positioning by means of simple, accessible adjustment controls at the front of the head.

RUGGED—These heads are truly heavy-duty workhorses with 30 H.P. capacity.

FULL WORK CONTACT—On even the most irregular work shapes, Murray-Way's 55 Heads remain in constant contact—NO EXTRA PASSES—LOWER OPERATING COST—MORE PRODUCTION.

The technical know-how of Murray-Way's experienced engineers is the reason that production men who want a BETTER WAY . . . SPECIFY MURRAY-WAY.

FOR COMPLETE INFORMATION WRITE

MURRAY WAY

MURRAY-WAY CORPORATION

P. O. BOX 180, MAPLE ROAD EAST · BIRMINGHAM, MICH.

Polishing, Buffing, Grinding, Filtering Equipment that automatically cuts your costs.

"REMINDS ME OF MY *PACKER-MATIC* UNIFORMITY"

PACKER-MATICS ability to polish and buff your product with the highest degree of uniformity . . . automatically at high speed . . . affords plenty of profit opportunities for you.

As the products move from station to station, precisely angled and evenly dressed wheels produce consistently better finishes in a fraction of hand operation time . . . automatically.

There are a variety of Packer-Matics with the speed and versatility to meet your most exacting requirements for faster, more uniform, low cost polishing, buffing and deburring.

No. 14-8 ROTARY INDEXING

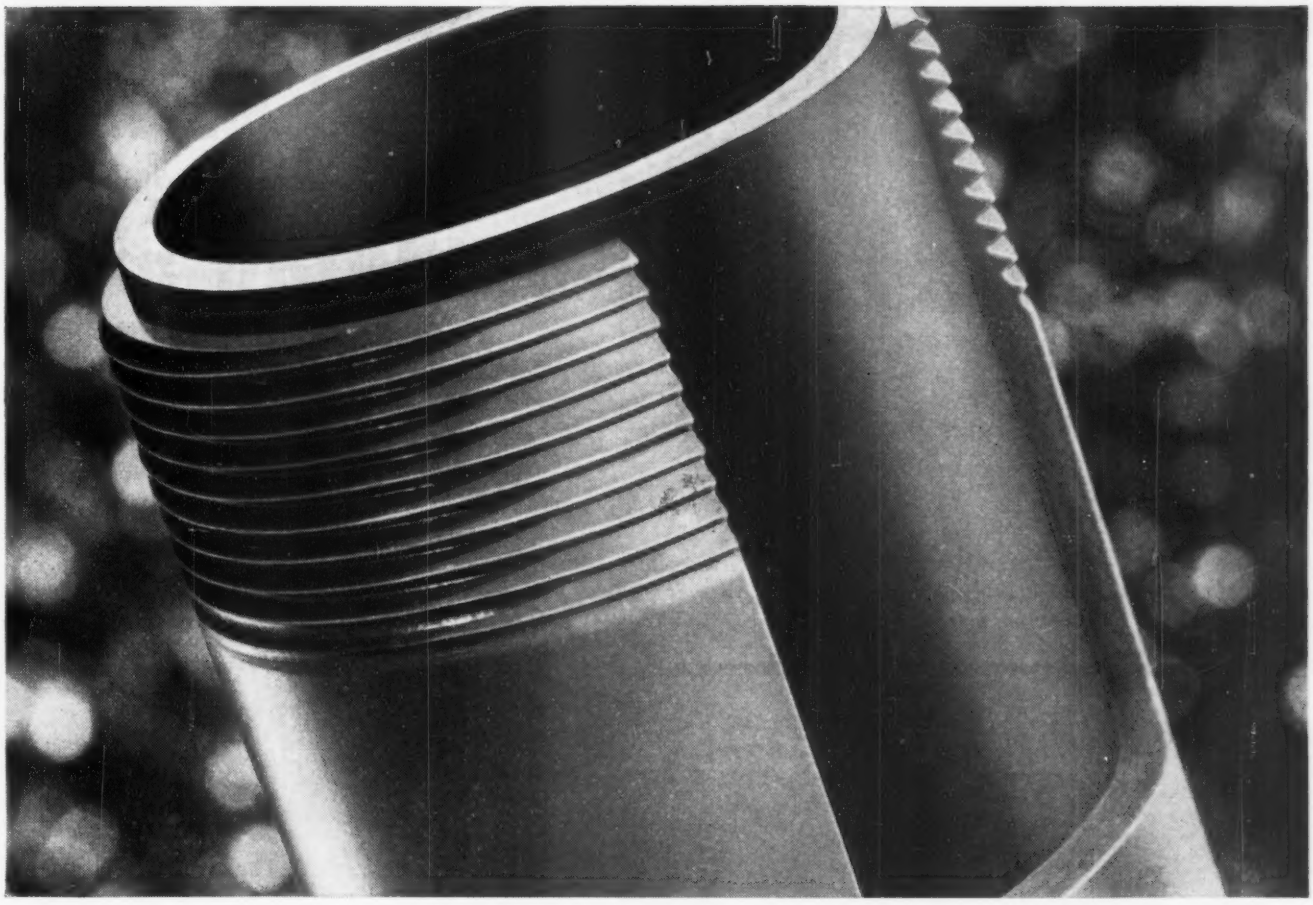
OUR ENGINEERING STAFF INVITES YOUR INQUIRY.

PACKER-MATIC

AUTOMATIC MACHINES FOR BUFFING • POLISHING • DEBURRING

THE PACKER MACHINE COMPANY • MERIDEN, CONNECTICUT

DOW



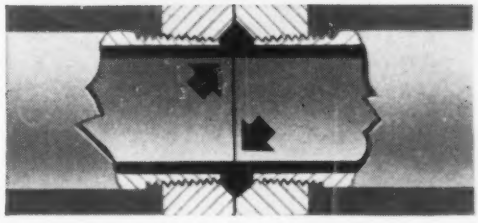
You can see why Saran Lined Pipe cuts corrosion costs

It's made of corrosion-resistant saran swaged into rigid non-bursting steel . . . liquid never touches metal in these installations

Here's your best way to convey acids, alkalies and other corrosive liquids—saran lined pipe, fittings and valves. This modern piping is corrosion resistant . . . forms snug, leakproof joints . . . is available for working pressures up to 150 psi. Fittings and valves are also available in steel for working pressures to 300 psi.

Installation costs are low with saran lined pipe, fittings and valves. Saran lined pipe can be cut and threaded in the field with available pipe-fitters' tools. Its rigidity means few supporting structures are needed.

Saran lined pipe has an outstanding record of trouble-free performance in the chemical, petroleum, waste, pulp and paper, metal finishing, and food processing industries. For further information send in the coupon at the right. THE DOW CHEMICAL COMPANY, Midland, Michigan.



Liquid never touches metal in saran lined pipe even at a flanged connection like this.

Saran Lined Pipe Company
2415 Burdette Avenue
Ferndale 20, Michigan
Dept. SP625C

Please send me information on saran lined pipe, valves and fittings.

Name_____ Title_____

Company_____

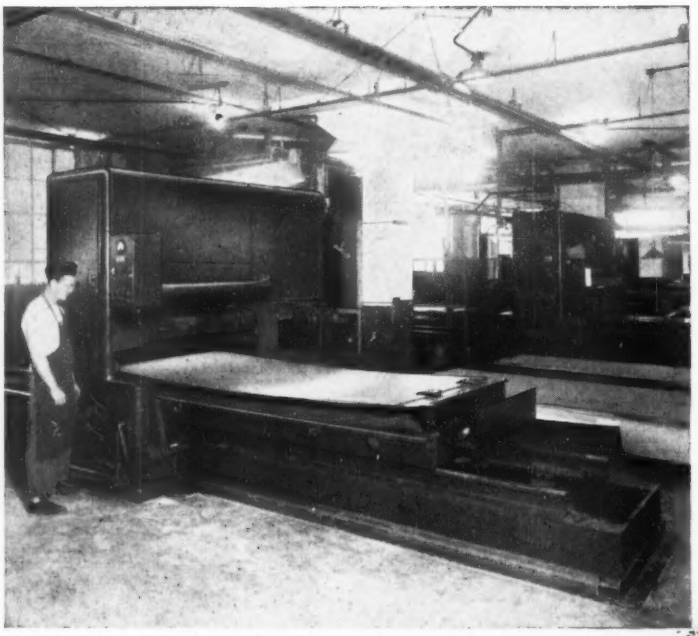
Address_____

City_____ State_____

Saran Lined Pipe is Manufactured by
The Dow Chemical Company, Midland, Michigan

you can depend on DOW PLASTICS

DOW



HILL Sheet Grinder and Polisher with reciprocating hydraulic table processing individual sheets.

HILL

GRINDING and POLISHING MACHINES

How much is it costing you to produce ACCEPTABLE finishes on FLAT surfaces

HILL Pinch Roll Grinder and Polisher for "Wet" or "Dry" operations. (Shown in series for straight line production)

HILL 2-Roll Vertical Abrasive Belt Grinding and Polishing machines are the logical result of 25 years of research and experience in producing self contained units for successfully processing ferrous and non-ferrous sheets. We have consistently proven that wide abrasive belt grinding and polishing equipment must incorporate these fundamental features — rugged construction, simplicity of design, accessibility, versatility and centralized controls.

HILL abrasive belt polishing machines are recommended for continuous operation and insure lower production costs with superior finishes as required today by the manufacturers of decorative plastics, food processing equipment, automobile bumpers, lithographers and photo engravers plates, home appliances, etc., etc.

Both types of machines are normally built up to 60″ wide, and larger capacity equipment can also be furnished.

Your inquiries are solicited for detailed information and recommendations.

TOOLS FOR INDUSTRY

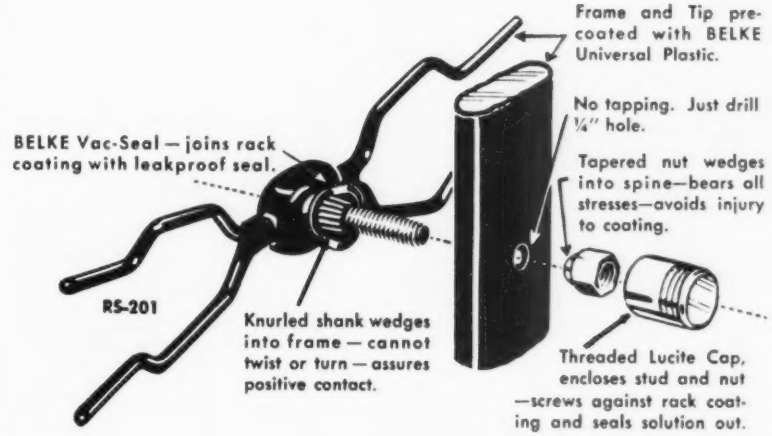
THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

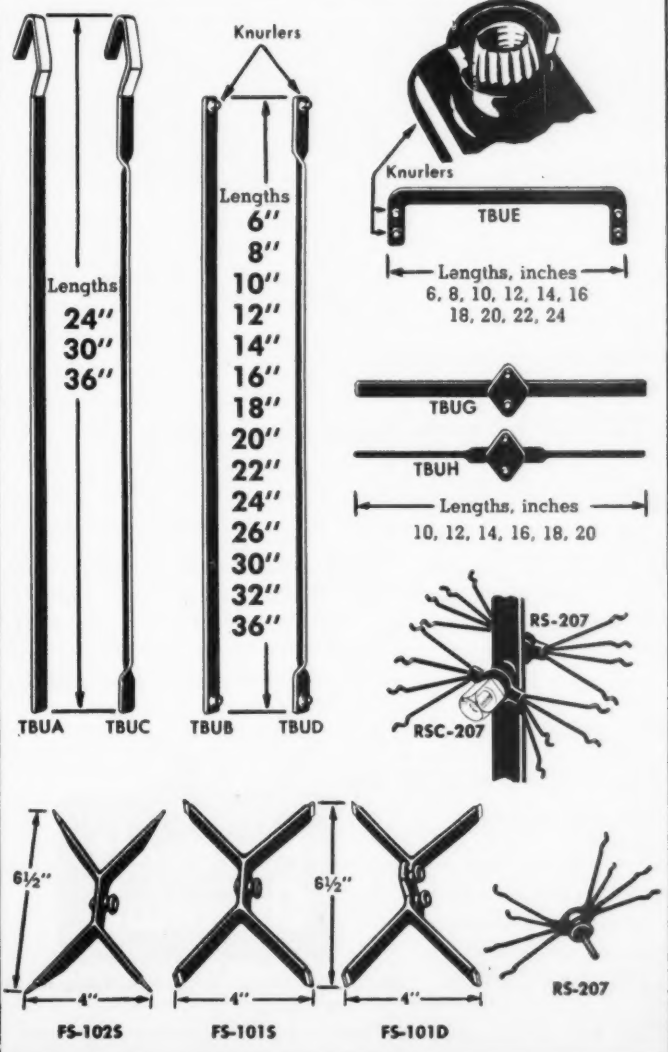
"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

No Waiting--BIG Saving

With BELKE Thinker Boy Plating Rack Assemblies


Frame and Tip pre-coated with BELKE Universal Plastic.
No tapping. Just drill ¼" hole.
BELKE Vac-Seal — joins rack coating with leakproof seal.
Tapered nut wedges into spine—bears all stresses—avoids injury to coating.
RS-201
Knurled shank wedges into frame — cannot twist or turn — assures positive contact.
Threaded Lucite Cap, encloses stud and nut —screws against rack coating and seals solution out.

You can be ready to plate in minutes



An investment-- not an expense!

When Thinker Boy Racks are no longer needed *they do not become useless as do other racks–*

You can quickly change the tips, change spacing of the tips or convert Thinker Boy Racks to other designs–

With an accumulation of Thinker Boy Members and Tips, *you can have specially designed racks for the mere cost of assembly*–be ready to plate a new job efficiently in minutes or hours instead of days or weeks.

Amazing Adaptability

Thinker Boy affords amazing advantage in efficiently meeting widely varied racking needs.

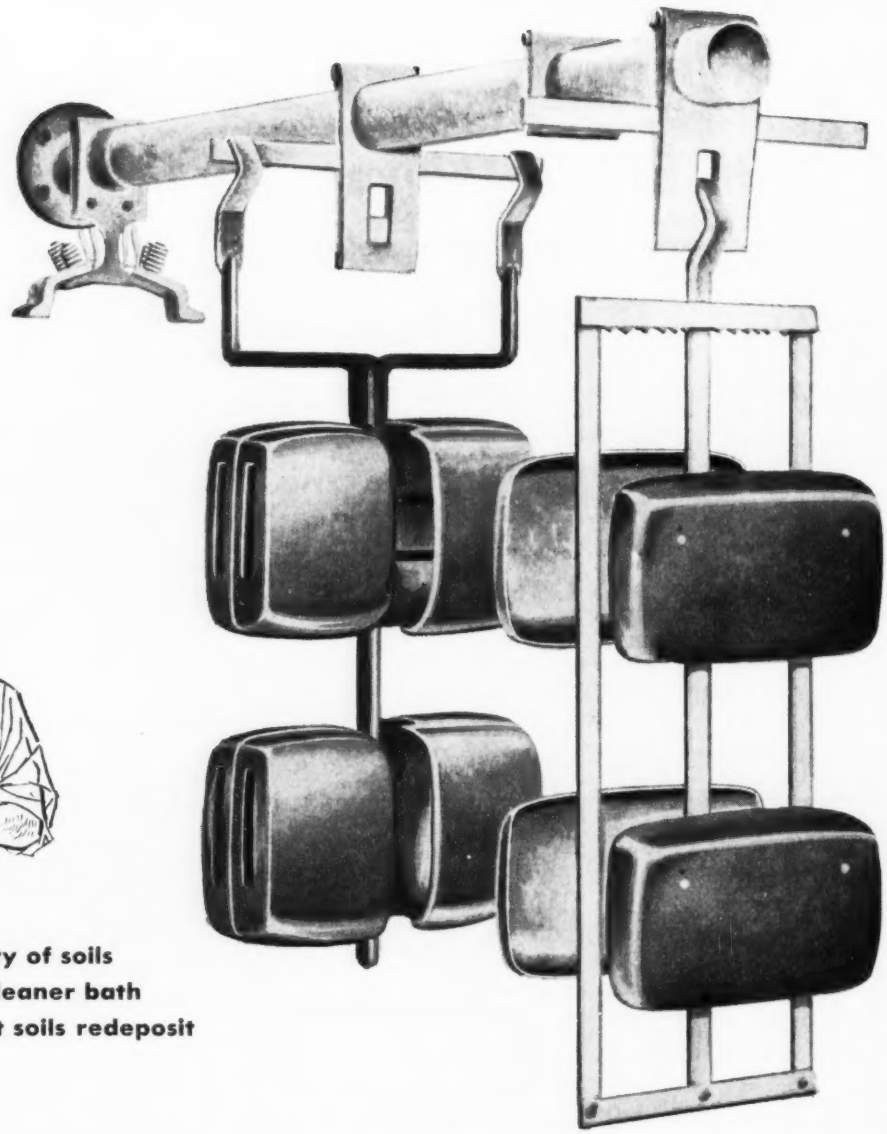
You can assemble racks of just about any style or type. You can have the exact tip arrangement and spacing that suits the job. *You can adjust Thinker Boy Tips to hold an unbelievable variety of articles.*

New literature, just off the press, shows how. Illustrated Thinker Boy Rack Members and Thinker Boy Tips. Shows how to assemble many different types of racks and how to adjust standard Thinker Boy Tips.

Ask your BELKE Service Engineer or write.

Belke Manufacturing Co.
947 N. Cicero Ave., Chicago 51, Ill.

EVERYTHING FOR PLATING PLANTS



PENNSALT CLEANER 36

- **Removes greater variety of soils**
- **Extends life of electrocleaner bath**
- **Rinses freely—won't let soils redeposit**

FOR A BETTER PLATE AT LOWER COST, soak-clean steel parts with new PENNSALT CLEANER 36

Here's a new soak-tank cleaner that's sure to bring down the cost of starting your plated finish! PENNSALT CLEANER 36 removes not only *more soil* but *more kinds of soil* than previous soak compounds. Because of its unusual detergent power and long life, Cleaner 36 lets you cut the concentration in your soak tank as much as 50% without losing cleaning efficiency.

LONGER ELECTROCLEANER LIFE. When used as a pre-cleaner before an electrocleaner (such as Pennsalt K-8), Pennsalt 36 removes the worst shop grimes and buffing compounds, leaving the electrocleaner bath free to work more swiftly and last longer. Plating rejects drop, cleaning costs drop, profits increase.

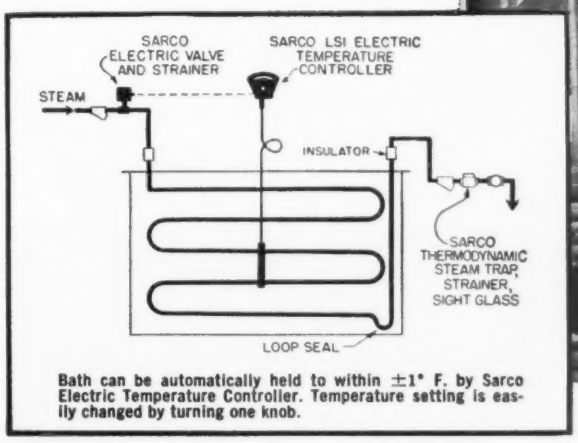
FREE RINSING. Once removed with Pennsalt Cleaner 36, soils can't redeposit on the work. Even if they dry on before rinsing, cleaner residue and soils flow off freely.

WATCH HOW 36 WORKS—in your own soak tanks! Ask the Pennsalt man for a demonstration, or write Metal Processing Dept. 230, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: Woolsey Bldg., 2168 Shattuck Ave., Berkeley 4, Calif. In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

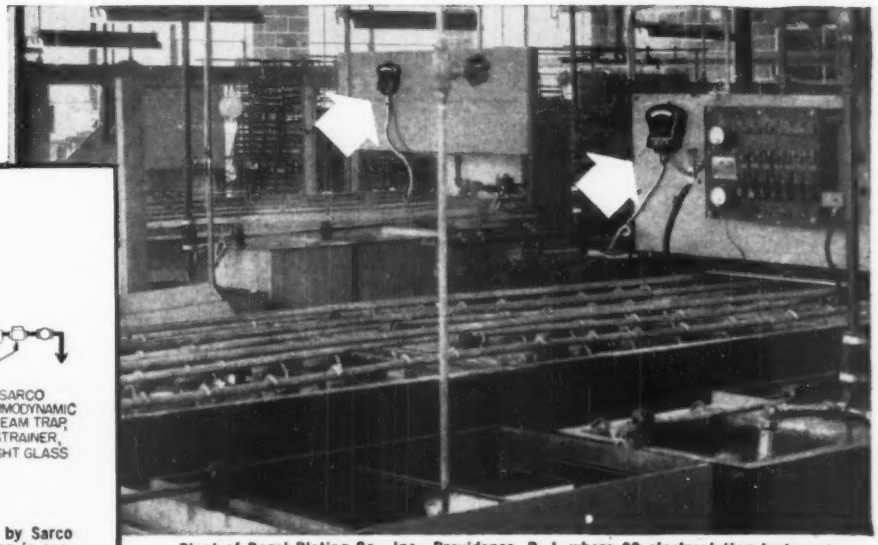
Pennsalt Chemicals

Metal Cleaners • Phosphate Coatings • Cold-Working Lubricants

A BETTER START FOR YOUR FINISH



Bath can be automatically held to within ±1° F. by Sarco Electric Temperature Controller. Temperature setting is easily changed by turning one knob.



Plant of Regal Plating Co., Inc., Providence, R. I. where 32 electroplating tanks are equipped with Sarco LSI Electric Indicating Temperature Controllers. Electroplating tanks: gold, hot nickel, silver, rhodium, and copper.

How low-cost Temperature Control ended "blue haze," pitting, burning

Regal Plating Co. now gets high quality plating with minimum of rejects

This well-known job plater specializes in high quality plating of costume jewelry and fishing lures. During an expansion program management ordered the elimination of these common plating difficulties: blue haze on nickel plate, pitting of copper plate and burning of sharp points.

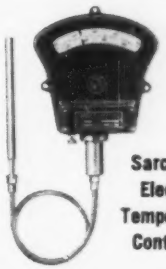
These troubles were due to creeping bath temperatures...the result of *manual* temperature control, which is always unreliable.

To solve these problems and step up efficiency, Regal installed Sarco LSI Electric Indicating Temperature Controllers on all 32 plating tanks. Result: above troubles completely eliminated, rejects greatly reduced, no more burnishing of nickel plate.

Sarco Automatic Temperature Control is surprisingly low in cost, simple, accurate, dependable. It pays for itself by lowering rejects, improving plating quality, and preventing waste of expensive solutions.

Investigate the advantages of Sarco Temperature Controllers. Write for Handbook No. 6 or consult your Plating Supplies Jobber. Sarco Company, Inc., Empire State Building, New York 1, N. Y. Representatives in principal cities.

SARCO *improves product quality and output*



Sarco LSI Electric Temperature Controller

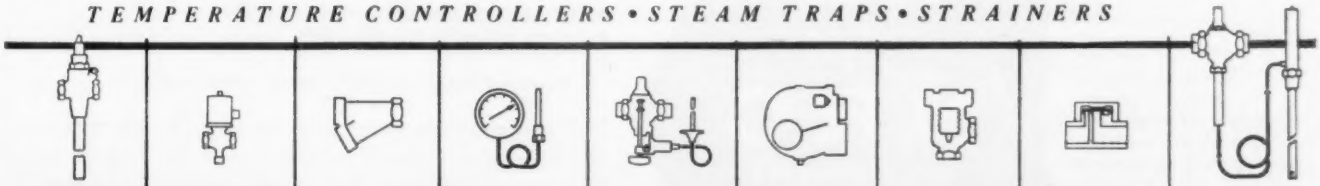
A COMPLETE SYSTEM FOR AS LITTLE AS $130 A TANK!

Think of it...automatic temperature control *that often pays for itself in weeks!*

Accurate to plus-minus 1° F. Simple. Dependable. Easily installed.

Easy-to-read controller dial clearly indicates temperature being maintained. Temperature setting quickly changed by turning one knob. 3124-B

TEMPERATURE CONTROLLERS • STEAM TRAPS • STRAINERS



Self-operated Cooling Controls | Electric Valves (solenoid) | Strainers | Dial Thermometers | Degreaser Vapor Line & Safety Controls | Float-Thermostatic Steam Traps | Thermostatic Steam Traps | Thermodynamic Steam Traps | Self-Operated Temp. Reg.

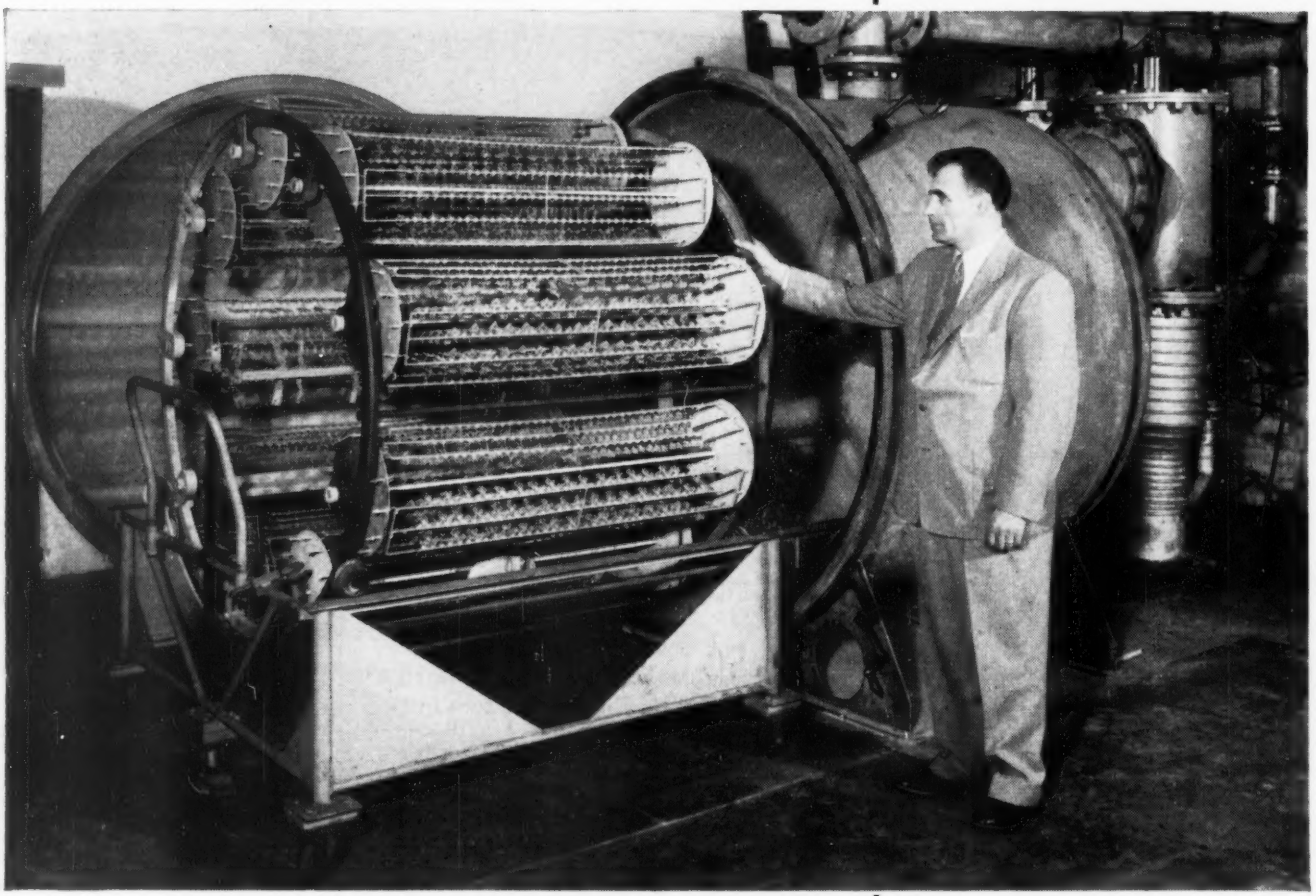
"Here's the Fastest Cycling, Easiest Operating Vacuum Coater I've Ever Used",

says

Mr. John Guleserian, President

Vacuum Plating Co.,
Providence, R. I.

Regal Plating Co. Inc.,
Providence, R. I.



Mr. Guleserian points out the easy-loading, "shadowless" *Planetary* jig in his NRC *Rapid Cycle* Vacuum Coater.

"Only one man is needed to slide this jig in and out. The mechanical pump is unaffected by the stickiest weather. The pumping system is easy to maintain . . . no booster pump used . . . one drum of mechanical pump oil lasts a year. The electrical power connections to the filaments are made automatically when the jig is inserted to eliminate operator error — a problem of other coaters I've seen. This NRC *Rapid Cycle* Vacuum Coater is a number one producer," says Mr. Guleserian.

Let us help you plan your complete vacuum coating process set-up. We can give you advice on dolly design . . . lacquer choice . . . size of coater and help in laying out your process to return the greatest profit to you.

Other NRC high vacuum products include: analyzers, dehydrators, freeze driers, impregnators, gauges, metallizers, pumps, valves.

NRC
EQUIPMENT
DIVISION

NRC EQUIPMENT DIVISION
NATIONAL RESEARCH CORPORATION
Dept. 133, Charlemont St., Newton Highlands 61, Mass.

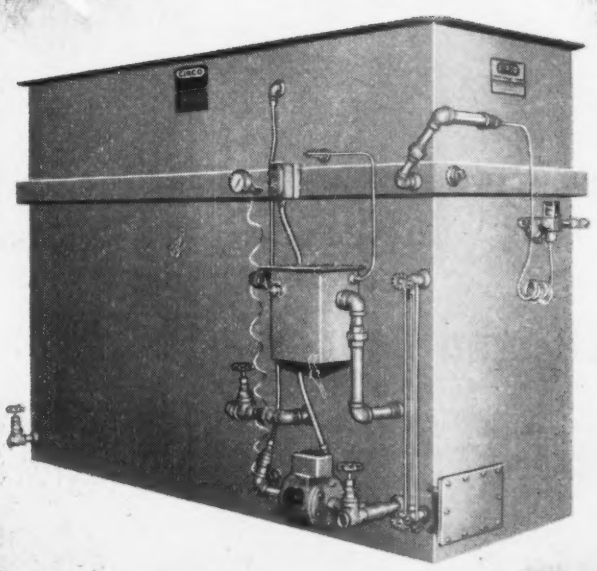
Please send me the "Rapid Cycle" Vacuum Coater Bulletin.

Name_____ Title_____

Company_____

Address_____

City_____ State_____



- Unobstructed side walls
- Large storage tank
- Demand type water control
- Choice of heating systems
- Leak-proof stainless steel pump
- One-piece condensate coils

the new, all new CIRCO degreaser

Completely redesigned for performance and economy, the revolutionary new Circo degreaser will save you 30% or more on solvents, 40% on maintenance *and will last twice as long*. Over 208 standard models in numerous corrosion-resistant combinations are available to meet your every need. Advanced design for long life and dependability, operating advantages never before realized, and a nation-wide engineering field service combine to make Circo vapor, solvent-vapor-solvent, vapor-spray and ultrasonic quality degreasers the economical answer to every mass production or small shop requirement.

Complete information on request
Bulletin OP2 on solvent degreasers
Bulletin UC1 on ultrasonic equipment
Bulletin 521 on metal washing equipment

CIRCO *Since 1923*

CIRCO EQUIPMENT COMPANY
51 Terminal Avenue, Clark (Rahway), New Jersey

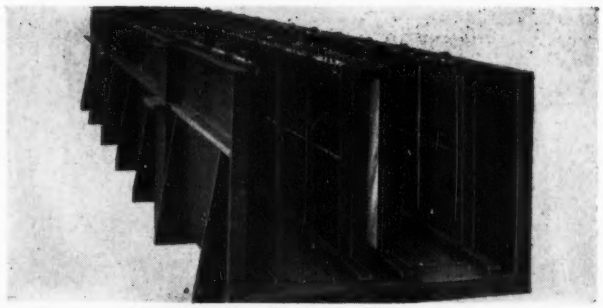
OFFICES IN PRINCIPAL CITIES
Nation-wide Engineering Field Service

• A remarkable advancement in electroplating, Diaphragm Systems, engineered and installed by ARco have created a new high standard in plating production and quality.

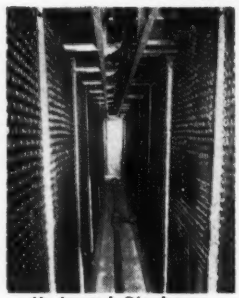
Simply, economically installed, Diaphragm Systems efficiently segregate the anolyte from the catholyte through canvas barriers between anode and cathode compartments.

This ARco electroplating method, combined with ARco Rubber Lined Tanks and planned solution circulation, filters metallic insolubles from outside sources.

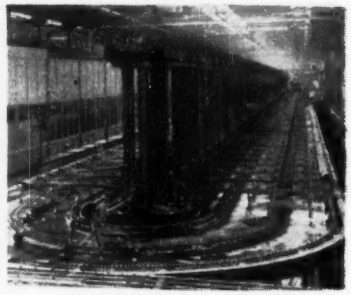
To reduce costly buffing due to roughness . . . prevent rejects resulting from thin spots . . . have an ARco engineer show you how simply Diaphragm Systems can save time, materials . . . and customers . . . for you.



Two Work Lane Diaphragm Plating Tank



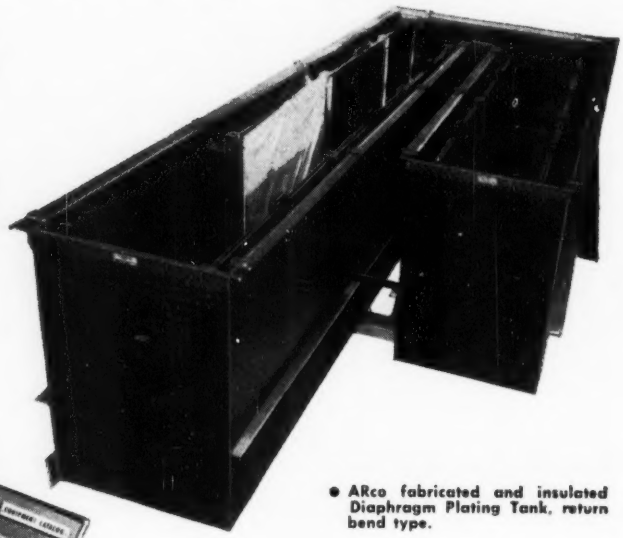
Horizontal Diaphragm Installation



Vertical Diaphragm Installation

For uniformly high quality and economy in plating . . .

DIAPHRAGM SYSTEMS *and* RUBBER LINED TANKS *by* ARco



• ARco fabricated and insulated Diaphragm Plating Tank, return bend type.

GET THIS VITAL PLATING INFORMATION...SEND COUPON TODAY!
"Diaphragm Tanks Promote Plating Progress." This explanatory, illustrated booklet is yours without obligation. Send for it today!
ARco

AUTOMOTIVE RUBBER COMPANY, INC.
12572 Beech Road at P. M. R. R.
Detroit 39, Michigan

Please rush me_____copies of your "Diaphragm Tanks Promote Plating Progress."

☐ Have your representative call on us.

Name_____

Title_____

Firm Name_____

Street_____

City_____ Zone_____ State_____

Licensed Saran Applicators

Anything can be covered with rubber — by ARco

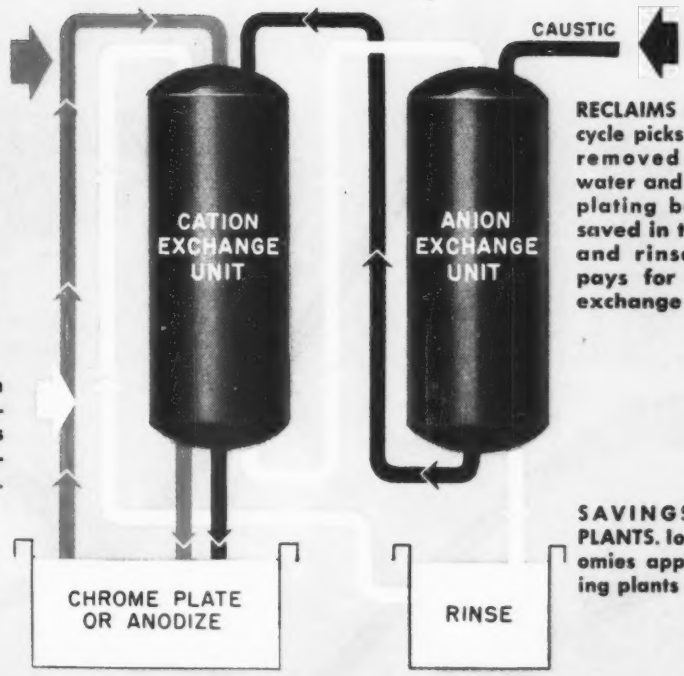
AUTOMOTIVE RUBBER CO.
INCORPORATED
Manufacturers • Designers • Engineers

12572 BEECH ROAD • DETROIT 39, MICH.

ARco RUBBER PROCESSORS
4033 HOMESTEAD ROAD · HOUSTON, TEXAS

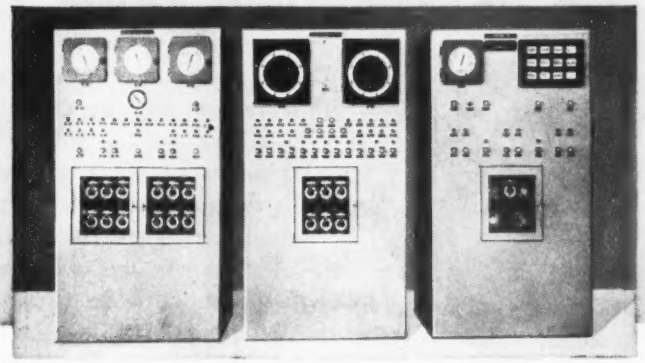
RENEWS PLATING BATH. This cycle removes aluminum, copper, iron and other impurities . . . allows continued re-use of bath . . . eliminates disposal problem. Compared with the usual toxic-waste disposal equipment, ion exchange saves up to 50% on initial costs, 75% on operating costs, 80% on floor space.

RENEWS RINSE WATER. Cation unit removes metallic impurities . . . anion unit removes chromic acid . . . allowing continued reuse of rinse water. Cuts consumption 90%!



RECLAIMS CHROMATE. This cycle picks up chromic acid removed from the rinse water and returns it to the plating bath. Chromate saved in the plating bath and rinse water often pays for the entire ion exchange installation!

SAVINGS FOR SMALL PLANTS. Ion exchange economies apply to small plating plants as well as large.



AUTOMATIC CONTROLS for ion exchangers in an auto parts plating plant. These controls simplify operation. No specially trained operators or technicians required.

©The Permutit Company

Ion Exchange Cuts Plating Costs

Modern ion exchange equipment really pays off for plating plants. Here's why:

Faster production. Dip periods are shorter, and there's no down-time for dumping because baths are always at full strength. Time savings are biggest for bright-dipping, anodizing, etching, stripping.

Better quality. Clean baths produce more uniform plating deposits. Clean rinses prevent water stains and spots.

Lower operating costs. Contaminant-free baths use less current. The improved quality means fewer rejects . . . and reduced polishing and wiping costs.

A large aircraft manufacturer saved $10,000 on anodizing in the first year with ion exchange. A leading auto maker prevented a stream pollution shut-down, improved quality, reduced costs . . . and uses the same ion exchange equipment for treating other process water in the plant!

Largest manufacturer of ion exchange equipment, The Permutit Company, is the only firm that offers a complete ion exchange service: rinse water or bath analysis, engineering, equipment, ion exchange resins and automatic controls . . . *all from one source.*

For details, write: The Permutit Company, Dept. MF-3 330 West 42nd St., New York 36, N. Y.

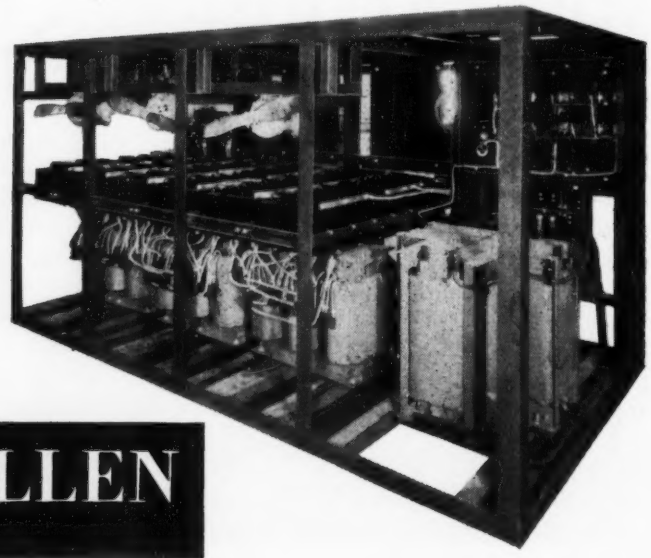
PERMUTIT®

rhymes with "compute it"

ION EXCHANGE for Water Conditioning
Chemical Processing • Industrial Waste Treatment

They may Look alike

. . . but they're as different as one day from another. Rectifiers, too, are highly individualized. They're built to meet your specific industrial needs, as prescribed by Richardson-Allen's staff of experienced engineers. Years of "know-how" are evidenced in these custom made precision-built rectifiers. Richardson-Allen . . . builders of the finest in rectifiers—selenium, germanium, etc. Write today for complete information.



RICHARDSON ⚡ ALLEN
CORPORATION
DEPENDABLE RECTIFIER SPECIALISTS

a manufacturing affiliate of **WESLEY BLOCK AND CO.**, 39-15 MAIN STREET, FLUSHING, N. Y.
IN CANADA: Richardson-Allen of Canada, Ltd., 370 Victoria St., Toronto, Canada

TYGON IS TOPS

For Lining Tanks

Here's why...

TYGON's outstanding resistance to acids and alkalies permits its use in all the usual lining and covering jobs.

TYGON's unique resistance to oxidizing acids, oils, greases, and solvents makes possible its use in jobs other linings cannot handle.

TYGON's flexibility permits close conformance, resulting in a good bond, to all but the most intricately shaped equipment.

TYGON's resilience minimizes the possibility of damage from mechanical abuse.

TYGON's elasticity permits thermal contraction and expansion without rupture.

TYGON's abrasion resistance withstands the wearing action of thick slurries and dry or moist chemicals.

TYGON's negligible extractibility prevents contamination of the most sensitive solutions.

TYGON's availability in white (compound TL-104), as well as standard black, permits its use where solution visibility is highly important.

TYGON's high electrical resistivity prevents current losses in electrolytic action.

TYGON's smooth, non-porous surface makes for easier cleaning and greater solution flow.

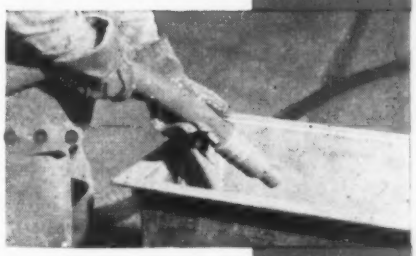
TYGON's thermoplasticity permits the "heat-sealing" of seams to form continuous, one-piece, impermeable linings.

TYGON's selective solvent sensitivity eliminates the "need" for curing to obtain a strong bond — makes possible installations of virtually any size — simplifies field repairs.

TYGON's non-oxidizing characteristics give it a long service life.

And remember, Tygon linings can be installed by a licensed Tygon applicator near you—with major savings in time and money.

Here's how...



Tank is sandblasted before lining.

Special cements are used.

Thick TYGON sheeting is applied.

Joints are "strip-sealed."

Entire lining is "spark-tested."

Write, right now, for more information! Ask for our new 12-page booklet on TYGON LININGS—Bulletin TL-526. It's packed with facts and figures.

LICENSED TYGON APPLICATOR

U. S. STONEWARE

AKRON 9, OHIO

158-D

PROCESS EQUIPMENT DIVISION

DAVIS-K GOLD PLATING SOLUTIONS

. . . Will Save You Time!

. . . Will Save You Money!

. . . Are Unconditionally Guaranteed!

Davis-K, through constant research and quality control methods, has consistently maintained its position as a leader in the metal plating field.

ALL DAVIS-K Gold Plating Solutions Are:

- Made in all colors
- Color-constant
- Tarnish-Resistant
- Brilliant in Finish
- Bottled by Troy weight
- Made from assayed US Treasury Gold only
- Ready for immediate use

NOW AVAILABLE — Variable-type Tank Rheostats . . . . specifically designed for precious metal plating.

New! HARD GOLD SOLUTION

Used and Endorsed by Leading Electronic Manufacturers

America's foremast electronic manufacturers give their unqualified approval to this New Hard Gold Solution, which Davis-K developed specifically for printed circuits and electronic parts.

This amazing new product cuts gold deposit 50%! It has maximum resistance to contact and abrasion, high throwing power, low resistance to high frequency, and metal and plastic remain firmly bonded. New Hard Gold Solution presents no control problem and it plates at low temperatures.

Small samples will be plated at no charge.

- **POTASSIUM GOLD CYANIDE SALTS**
- **LUSTROUS WHITE RHODIUM SOLUTION**

We are fully equipped to reclaim old gold and rhodium solutions.

ONE OPERATION

Antique Gold Solution

A QUALITY SOLUTION, with excellent color consistency and remarkable ease of operation. No production problems — truly economical, too!

"Where Glittering Elegance Reflects Lasting Quality."

100% PURE GOLD DKP SOLUTIONS

DAVIS-K PRODUCTS, CO.

135 West 29th St., New York 1, N. Y.

LOngacre 4-1978-9

---

avoid costly rejects due to unacceptable coating thickness...

For quality control and acceptance tests, measure thickness of coatings on metals the easy, accurate, non-destructive way, with the . . .

AMINCO BRENNER MAGNE-GAGE

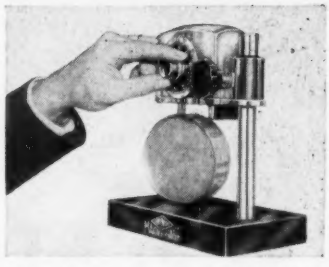
Widely used by industry and government for accurately measuring the thickness of:

1. Non-magnetic coatings (metallic or non-metallic) on magnetic base metals.
2. Nickel coatings on magnetic or non-magnetic base metals.

Measures coatings on plane, convex or concave surfaces. Gives speedy and accurate results. Easy to use by non-technical personnel.

Avoids expensive rejections due to coatings that may be too thin, or non-uniform. Eliminates the expense involved in re-plating or discarding specimens spoiled by destructive tests . . . every piece tested is unharmed and ready for use or shipment. Saves materials wasted by coatings thicker than necessary. Its use leads to the discovery of faults that may exist in plating methods or equipment.

Write for Bulletin 2253-G

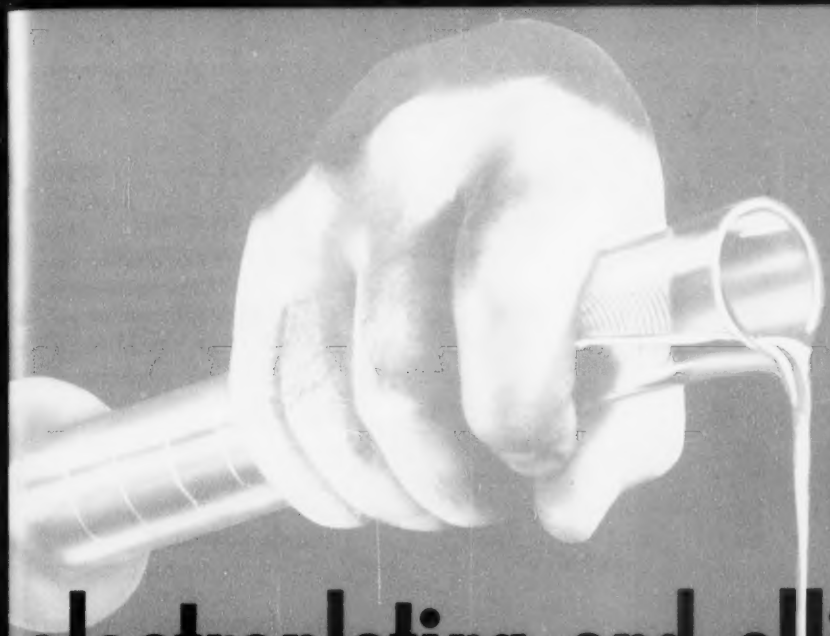


Coating on cylindrical object being measured with Magne-Gage

AMINCO *Laboratory Instruments*

AMERICAN INSTRUMENT COMPANY, INC.

Silver Spring, Maryland • In Metropolitan Washington, D. C.



BULLETIN P-102

H-VW-M

electroplating and allied processes

for Nickel, Zinc, Cadmium, Copper, Silver and Bright Alloy Plating; Metal Cleaning; Periodic Reverse Current Plating; and Magnesium Anodizing

Plus the exclusive H-VW-M

10-point service policy

HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY U.S.A. SINCE 1820

HANSON-VAN WINKLE-MUNNING COMPANY
MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing processes, equipment and supplies

Plants: Matawan, New Jersey • Grand Rapids, Michigan

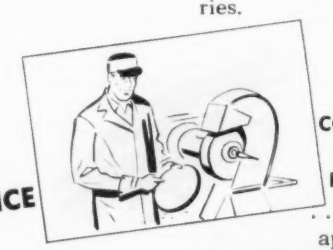
Sales Offices: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston • Bridgeport • Chicago Cleveland • Dayton • Detroit • Grand Rapids • Los Angeles • Louisville • Matawan Milwaukee • New York • Philadelphia • Pittsburgh • Plainfield (N. J.) • Rochester • St. Louis San Francisco • Springfield (Mass.) • Utica • Wallingford (Conn.)

Use H-VW-M PROCESSES

They are backed up with SERVICE

They cost no more—but you get more when you buy these processes . . . behind every one are H-VW-M's exclusive 10 points of complete electrochemical, electrical and mechanical service.

SERVICE — PERIODIC ANALYTICAL SERVICE . . . a quality control measure—samples of customers' processes regularly checked in H-VW-M laboratories.



SERVICE — COMPLETE FINISHING SEQUENCE RECOMMENDATIONS . . . with each process application, thorough data on proper polishing, buffing, pickling, plating and after-treatments.

SERVICE — CUSTOMERS' PRODUCTS PLATING LABORATORY . . . complete laboratory facilities available for trying out various processes on customers' products.

SERVICE — PLATERS' TRAINING COURSES . . . at no obligation to customers, plating personnel may receive thorough analytical and process training in H-VW-M laboratories.

SERVICE — PLATING PLANT LAYOUT SERVICE . . . expert assistance in planning most efficient plating installations and use of facilities.

SERVICE — TRAINED SALES REPRESENTATIVES IN ALL PRINCIPAL AREAS . . . immediate assistance on any plating problem is only a phone call away from any customer's office.

LEVELUME–The first nickel process combining full brightness with truly amazing leveling, at unusually high plating speeds. Solution conversion is simple, inexpensive. Increased plating speed, plus other characteristics, means production increases of up to 100%, without investment in new equipment.

NICKEL-LUME TYPE I—A perfected organic-type bright nickel process featuring: extreme deposit brilliancy with good ductility and high activity; excellent solution characteristics—stability, easily controlled, low cost operation.

NICKEL-LUME TYPE II—Similar to Type I, but designed for air agitation for highest plating speeds and/or heavy deposits.

NICKEL-LUME BRIGHT BARREL—Similar to above, but designed for use in mechanical plating cylinders. High ductility and activity permit subsequent chromium plating if desired.

9-H COBALT-NICKEL—A time-tested bright nickel process not dependent on organic addition agents for highly brilliant deposits. Properly installed, it is outstandingly stable, producing deposits with good physical properties and unsurpassed protective value.

NICKEL (Sulfamate)—A sulfamate salt process for producing heavy, smooth deposits with superb physical properties. Bath developed especially for build-up of nickel deposits of several thousandths and more. Ideal for electroforming and electrotyping operations.

CADALUME–A simple-to-operate, low-cost bath producing bright, uniform cadmium deposits. Has high throwing power, permits high speed plating. No loss of brilliance even with heavy deposits.

BBZ-201—For bright zinc plating in barrels. Produces zinc deposits ranging from silvery-bright to a brilliant bluish-white appearance directly from the bath. Bright dipping is optional.

WES-X COPPER—Smooth, brilliant deposits free from co-deposited organic brighteners. Exceptional corrosion protection, good physical properties and marked leveling when periodic reverse current is employed.

SILVER-LUME—The process that has changed long-standing concepts of silver plating. Produces brilliant and mirror-like silver deposits direct from the plating solution, satisfactory in many cases without subsequent buffing.

Bath has exceptional throwing power. Deposits are hard and wear-resistant, with high protective value, and are somewhat more resistant to tarnish than ordinary silver deposits.

S-B ZINC—An all purpose zinc bath producing satin-bright to full bright deposits (depending upon solution composition and operation conditions). Has remarkable throwing power and high surface activity for subsequent surface conversion coatings.

METAL CLEANING PROCESS—Alkaline, acid and emulsion cleanser products to meet any metal cleaning requirements. A full selection for soak cleaning, electrocleaning, horizontal barrel cleaning, oblique barrel cleaning, spray washing machine cleaning and for special cleaning applications.

PERIODIC REVERSE CURRENT—H-VW-M is the sole agent for marketing the Periodic Reverse Current Process. Competent technical assistance is available from H-VW-M for applying PR current to metal plating operations.

Complete information on individual H-VW-M processes is available in bulletin form.

SERVICE

NATION-WIDE TECHNICAL SERVICE

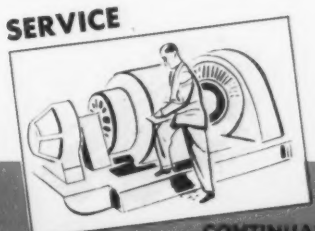
. . . field electrochemists available for on-the-spot technical assistance all over the country.

SERVICE

LABORATORY APPROVAL FOR ALL PROCESS PRODUCTS

. . . *all* chemicals, addition agents, and anodes for H-VW-M processes must pass rigid laboratory tests before being sold—your guarantee of consistently high quality.

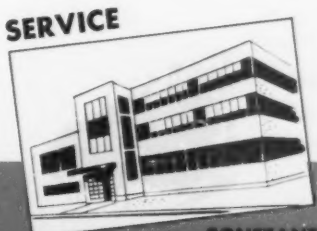
SERVICE



CONTINUAL TESTING OF ENGINEERED EQUIPMENT

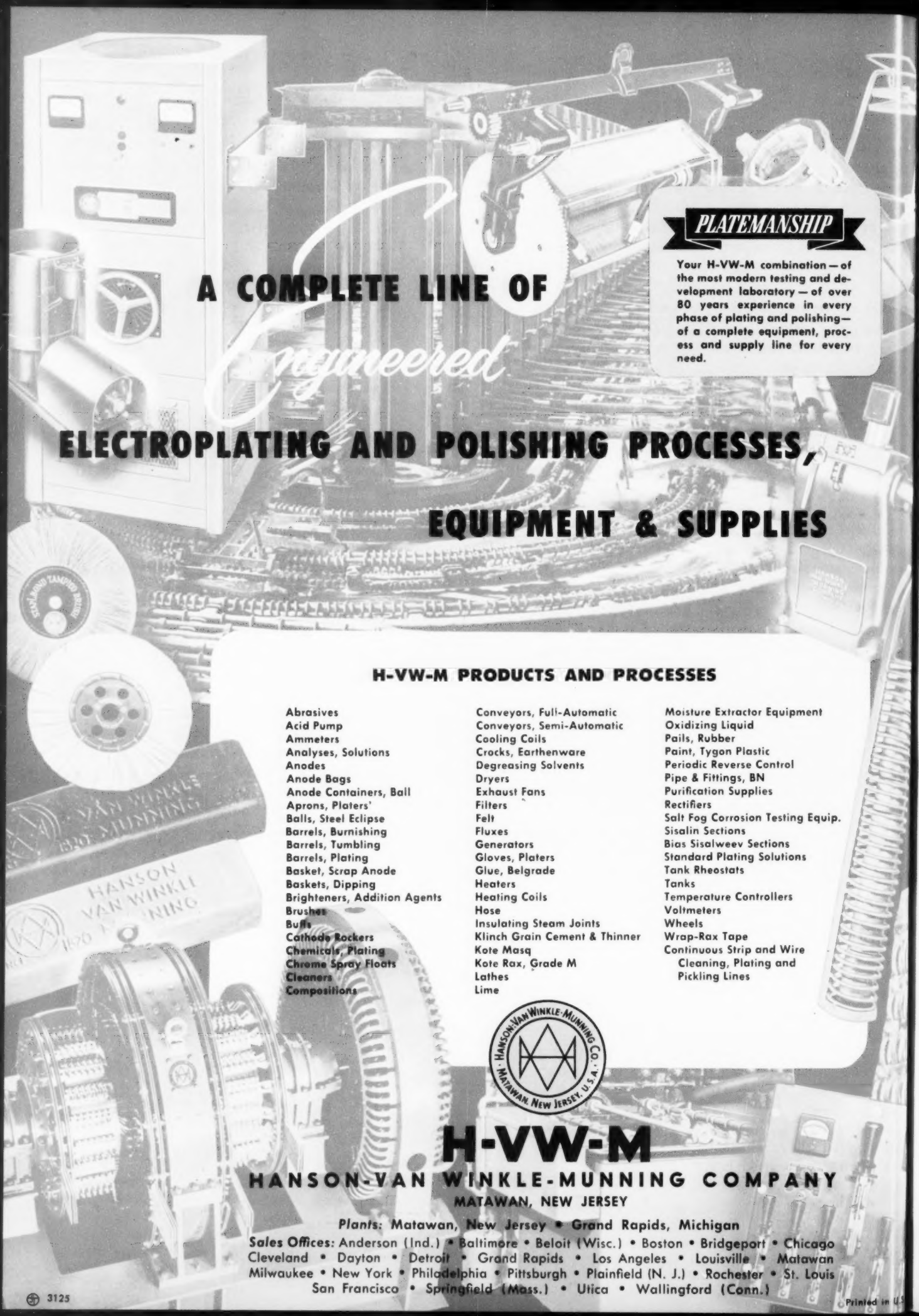
. . . all H-VW-M electrical and mechanical products continually tested *in use* with processes to check and refine performance characteristics.

SERVICE



CONSTANT DEVELOPMENT AND RESEARCH

. . . *all* H-VW-M processes continually tested to improve existing results and develop new, more efficient products, processes and procedures.



PLATEMANSHIP

Your H-VW-M combination — of the most modern testing and development laboratory — of over 80 years experience in every phase of plating and polishing — of a complete equipment, process and supply line for every need.

A COMPLETE LINE OF *Engineered* ELECTROPLATING AND POLISHING PROCESSES, EQUIPMENT & SUPPLIES

H-VW-M PRODUCTS AND PROCESSES

Abrasives
Acid Pump
Ammeters
Analyses, Solutions
Anodes
Anode Bags
Anode Containers, Ball
Aprons, Platers'
Balls, Steel Eclipse
Barrels, Burnishing
Barrels, Tumbling
Barrels, Plating
Basket, Scrap Anode
Baskets, Dipping
Brighteners, Addition Agents
Brushes
Buffs
Cathode Rockers
Chemicals, Plating
Chrome Spray Floats
Cleaners
Compositions
Conveyors, Full-Automatic
Conveyors, Semi-Automatic
Cooling Coils
Crocks, Earthenware
Degreasing Solvents
Dryers
Exhaust Fans
Filters
Felt
Fluxes
Generators
Gloves, Platers
Glue, Belgrade
Heaters
Heating Coils
Hose
Insulating Steam Joints
Klinch Grain Cement & Thinner
Kote Masq
Kote Rax, Grade M
Lathes
Lime
Moisture Extractor Equipment
Oxidizing Liquid
Pails, Rubber
Paint, Tygon Plastic
Periodic Reverse Control
Pipe & Fittings, BN
Purification Supplies
Rectifiers
Salt Fog Corrosion Testing Equip.
Sisalin Sections
Bias Sisalweev Sections
Standard Plating Solutions
Tank Rheostats
Tanks
Temperature Controllers
Voltmeters
Wheels
Wrap-Rax Tape
Continuous Strip and Wire Cleaning, Plating and Pickling Lines

HANSON-VAN WINKLE-MUNNING CO. · MATAWAN, NEW JERSEY, U.S.A. ·

H-VW-M

HANSON-VAN WINKLE-MUNNING COMPANY

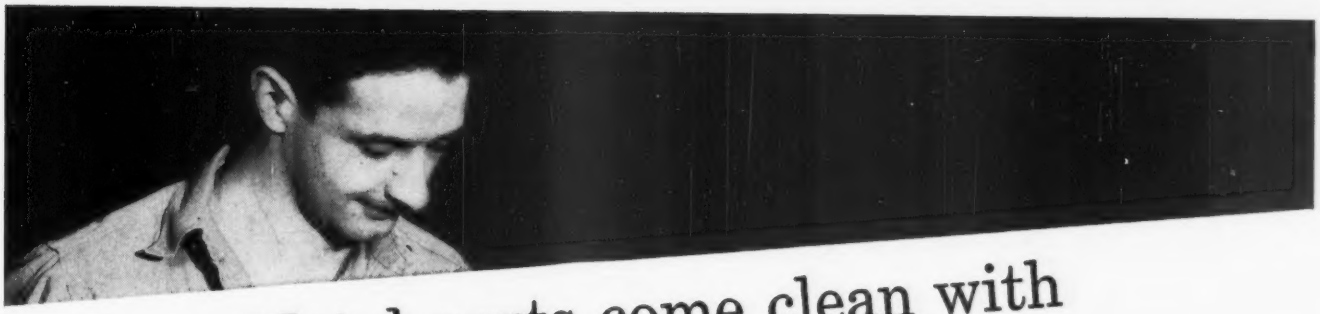
MATAWAN, NEW JERSEY

Plants: Matawan, New Jersey • Grand Rapids, Michigan

Sales Offices: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston • Bridgeport • Chicago Cleveland • Dayton • Detroit • Grand Rapids • Los Angeles • Louisville • Matawan Milwaukee • New York • Philadelphia • Pittsburgh • Plainfield (N. J.) • Rochester • St. Louis San Francisco • Springfield (Mass.) • Utica • Wallingford (Conn.)

3125

Printed in U.S.



Metal parts come clean with Nialk® TRICHLORethylene

Highest Quality • Re-usable • Economical

Photograph courtesy The Kleer-Flo Co., New York, N. Y.

NIALK TRICHLORethylene is one of the most efficient of all metal cleaning and degreasing agents.

Characterized by a high degree of purity, uniform quality and chemical stability, NIALK TRICHLORethylene is recoverable for re-use. This, coupled with its greater efficiency, makes it doubly economical... assuring you greater cleaning power from every gallon you buy.

Send for free illustrated booklet, NIALK TRICHLORethylene, *containing valuable data on the use and handling of this chemical.*

NIAGARA ALKALI COMPANY

60 East 42nd Street, New York 17, N. Y.

Plant: Niagara Falls, N. Y.

Manufacturer Reports

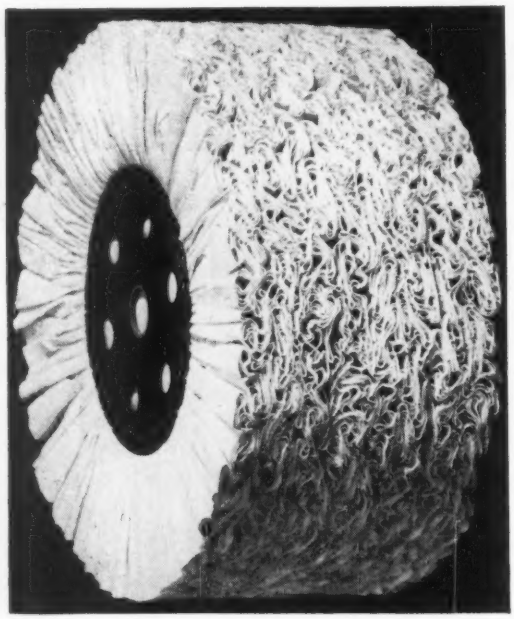
BETTER FINISH

with

HIGHER COLOR

with new Churchill

Finger-Buff* #300 H 15



This new Churchill Finger-Buff* No. 300H15 is a new type of Finger-Buff* . . . unique in that the face of the buff is deliberately made *non-uniform*. This eliminates all tendency to streak or gouge the work.

Manufacturers report that results with this new No. 300H15 are better finish with higher color on stainless, copper, and zinc die castings.

The Churchill Finger-Buff* No. 300H15 is made only with the best grade, heaviest weight, all new 86/93 bias-cut cotton cloth.

• *Churchill Finger-Buffs* are competitively priced. Produced in all sizes from 6" to 18" diameters. For complete information write your problem.*

Geo. R. Churchill Co., INC.

CHURCHILL FINGER BUFFS*

*Trade Mark Reg. U. S. Pat. Off.

REPRESENTATIVES IN PRINCIPAL CITIES

FREE Catalog

Geo. R. Churchill Co., Inc., Hingham, Mass., Dept. MF
Please send me FREE catalog and complete information.

• My special buffing problem is.....

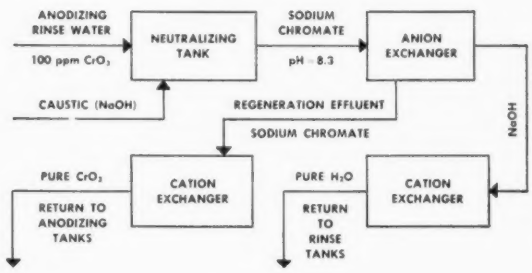
Name..... Title.....

Firm .....

Street .....

City..... Zone..... State.....

ILLCO-WAY ionXchange



RECOVERY OF CHROMIC ACID FROM ANODIZING RINSE WATER

The block diagram above indicates one method of using ionXchange to save money, in the plating rooms of a large automobile plant, by recovering the chromic acid from the rinse tanks of anodizing operations. The cost of equipment was much less than the cost of a disposal plant, and the savings through recovery were substantial enough to make the investment a very profitable one.

REMOVAL OF ALUMINUM FROM ANODIZING BATH

A secondary purpose for one part of the same installation was the removal of aluminum from the anodizing baths. When the concentration of aluminum in any anodizing tank rose to nearly 1 g. per liter, that tank was cycled through the cation exchanger and the aluminum removed, thus saving over $250 a week compared with partial dumping. *For details on this and many other money-saving applications of ILLCO-WAY ionXchange, write us or consult your Illinois Water Treatment Company representative.*

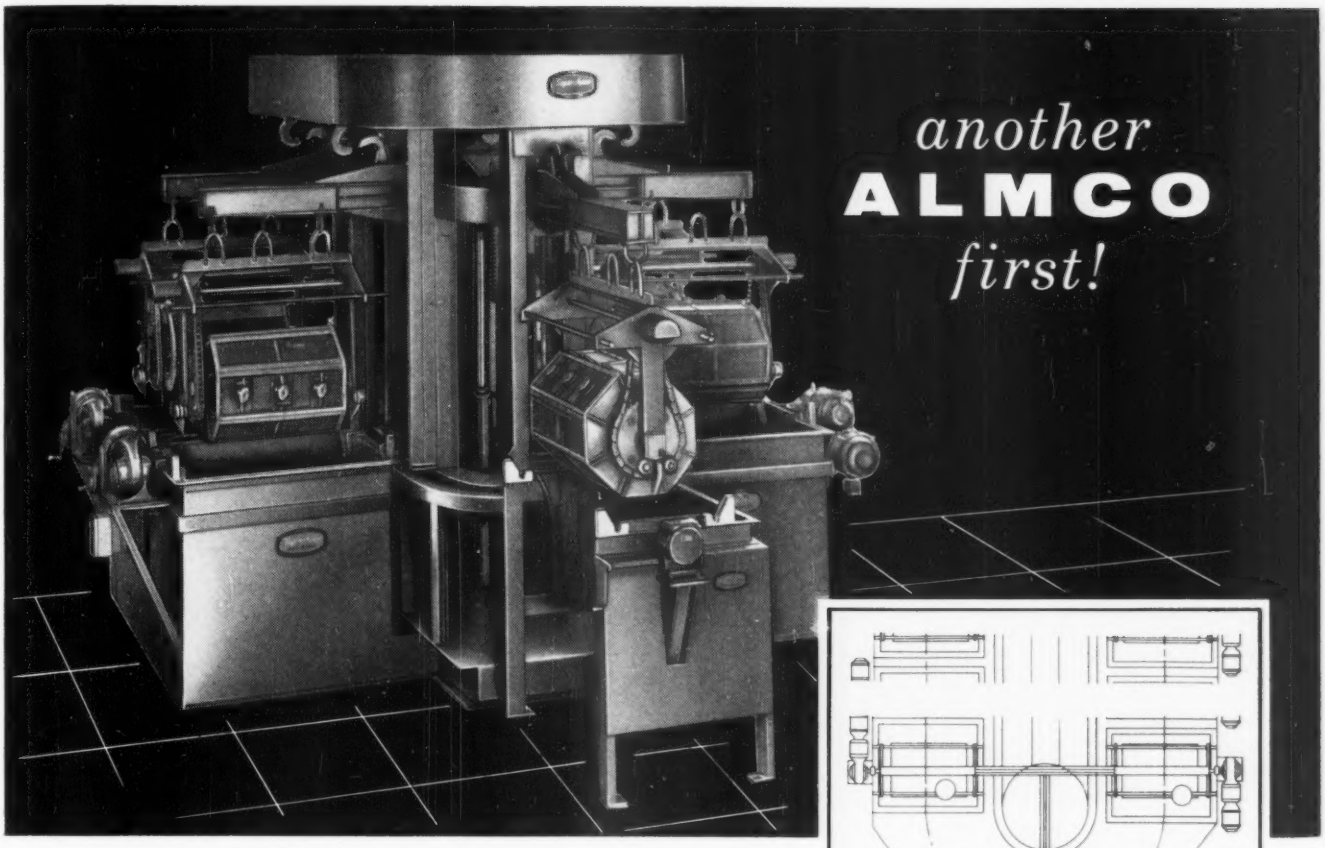
ILLINOIS WATER TREATMENT CO.

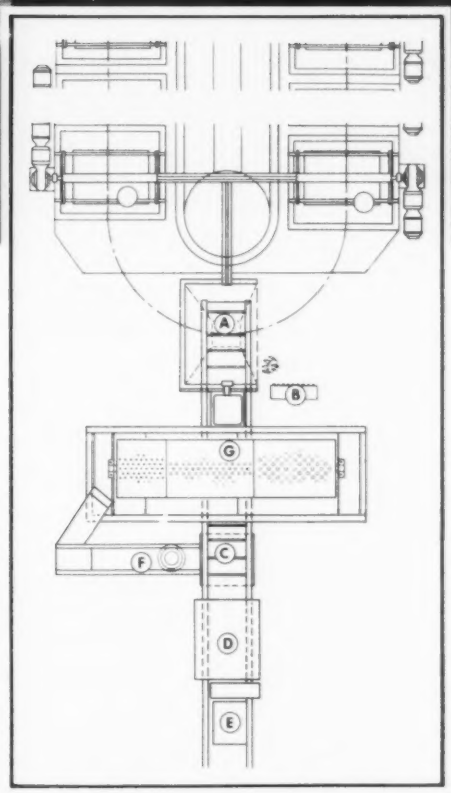
840 CEDAR ST., ROCKFORD, ILLINOIS

ILLCO-WAY ionXchange

NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N.Y.
CANADIAN DIST. PUMPS & SOFTENERS, LTD. LONDON, ONT.

AUTOMATION / comes to BARREL FINISHING





From Detroit . . . Cleveland . . . Chicago . . . New York . . . almost every metal-working center—for more than a year—queries have been coming in asking, "What's this about ALMCO's automated barrel finishing?" Here, for the first time, are all the facts . . .

COMPLETELY AUTOMATIC OPERATION. Supersheen ***SUB-O-MATIC*** submerged-type automated barrel finishing systems, researched and developed exclusively by ALMCO, daily are achieving micro-precision grinding and burnishing of mass production parts by the push of a button. These highly versatile systems can be engineered to handle almost any production requirements; micro-finishing operations performed include descaling, deburring, grinding, burnishing, rinsing and rust inhibiting. And one man, by pre-set controls, maintains continuous production ***through all operations.***

Vital to the peak efficiency of these systems are specially engineered materials handling units (*see diagram*). Even delicate centerless ground steel parts are automatically handled without impingement or peening action. Too, the media is loaded, unloaded, separated and reclassified automatically after every cycle, thus eliminating possible errors or mix-ups.

TREMENDOUS COST SAVINGS. Besides absolutely unequalled finishes on high production parts, cost savings are so great that a Supersheen ***SUB-O-MATIC*** System can actually pay for itself ***in less than one year!*** Money saved on finishing compounds alone can, in some cases, do this. Reduced labor costs, greater production and better finishes are other positive advantages which Supersheen ***SUB-O-MATIC*** Systems have already brought the metal-working industry.

We invite you to sample process your production parts in the Supersheen ***SUB-O-MATIC*** System in our Albert Lea laboratory; you'll quickly see how you can achieve ultra-low micro-inch surfaces and closely-formed radii—not now obtainable even by other barrel finishing equipment—at tremendous cost savings to your company. Write for the new Supersheen Automated Barrel Finishing Catalog, ABF-101.

Parts and media are loaded and unloaded at Station (A). All operations automatically controlled at CONTROL PANEL (B). Parts and media are metered to MAGNETIC SEPARATOR (C). Parts pass along conveyor through DRIER (D) and then to "pick-off" table for assembly or storage. Media drops into VERTICAL BUCKET ELEVATOR (F) and is carried up to ROTARY SCREEN CLASSIFIER (G) where various size media are separated and drop into overhead hopper. Barrels are then reloaded with correct media by air-operated control and ready for new finishing cycle.

ALMCO

DIVISION OF
QUEEN STOVE WORKS, INC.
43 MARSHALL STREET
ALBERT LEA, MINN.

"TAKE-OFF" TIME IS VITAL!

NEW non-inflammable PAINT STRIPPER takes off enamel, varnishes, lacquers and film in less time, *every time!*

INSTANTANEOUS STRIPPING ACTION . . . *QUICK-STRIP* #8 removes most finishes with amazing rapidity, yet without detrimental, corrosive effect.

WATER RINSIBLE . . . *QUICK-STRIP* #8 is a water flush-off remover that leaves a clean metal surface for subsequent operations.

ECONOMICAL & EASY TO USE . . . Applied by dip, brush or spray at room temperature. Uniform stripping action. Will not affect ferrous or non-ferrous surfaces.

QUICK-STRIP #8 Available in 5 gallon or 55 gallon containers.

For cold emulsion cleaning requirements investigate our NEW Emulsion Cleaner #26.

Mitchell-Bradford

MITCHELL-BRADFORD CHEMICAL CO.
WAMPUS LANE MILFORD, CONNECTICUT

QUALITY PRODUCTS OF CHEMICAL RESEARCH

A Timely Message on

The Role of the Engineer

by **Ben P. Sax**

President, American Buff Company

Have you ever stopped to consider what engineers mean to your business? Have you ever given thought to how much they contribute to your product . . . its acceptance . . . its sales?

We glorify the salesman with just reason . . . he brings in the life-blood of our business . . . orders. However, it would be difficult for a salesman to make the sale without the important contribution of the engineer. He is the man-behind-the-scenes who designs the product that the salesman sells.

Thinking back before World War II, many companies had little or no idea how their products developed . . . they just "grew." Very little thought was given to such factors as research, product design and development to fit the customer's needs. Since the war, those firms that have given engineers "leeway" for product development have progressed and expanded their scope immeasurably.

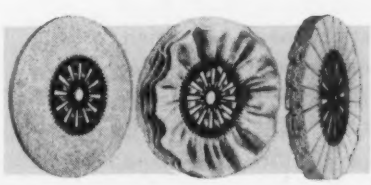
The design engineers in our own plant have made unlimited contributions to our growth as leaders in the buffing field. Without them, we would be just another manufacturer of buffs . . . scratching for business from day to day. Each new product that American Buff Company has presented to industry has been the result of months and even years, of planning and research, designing, experimentation and final testing. Our engineers have emerged with such significant achievements as our patented Centerless Buff, our unusual advances in the use of sisal buffs and our new "Golden Treatment" on sisal buffs.

Yes, the evidence is inescapable . . . the engineer is a strong asset to the progress of any company that intends to keep a big step ahead of competition.

Sincerely,

Ben P. Sax

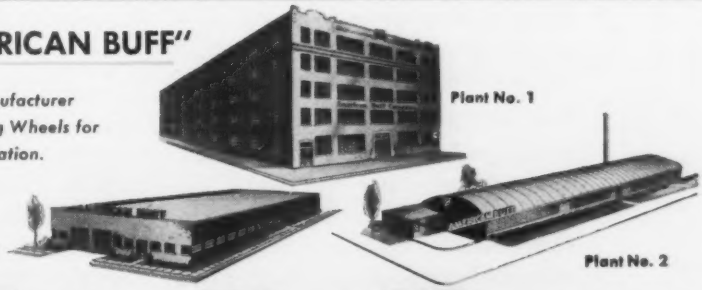
"For the job that's TOUGH—use an AMERICAN BUFF"



UNIT • UNIT SISAL • BIAS SISAL • OPEN BIAS SISAL

Patented Centerless or
Permanent Center Construction

World's Largest Manufacturer of Buffs and Polishing Wheels for Every Finishing Operation.

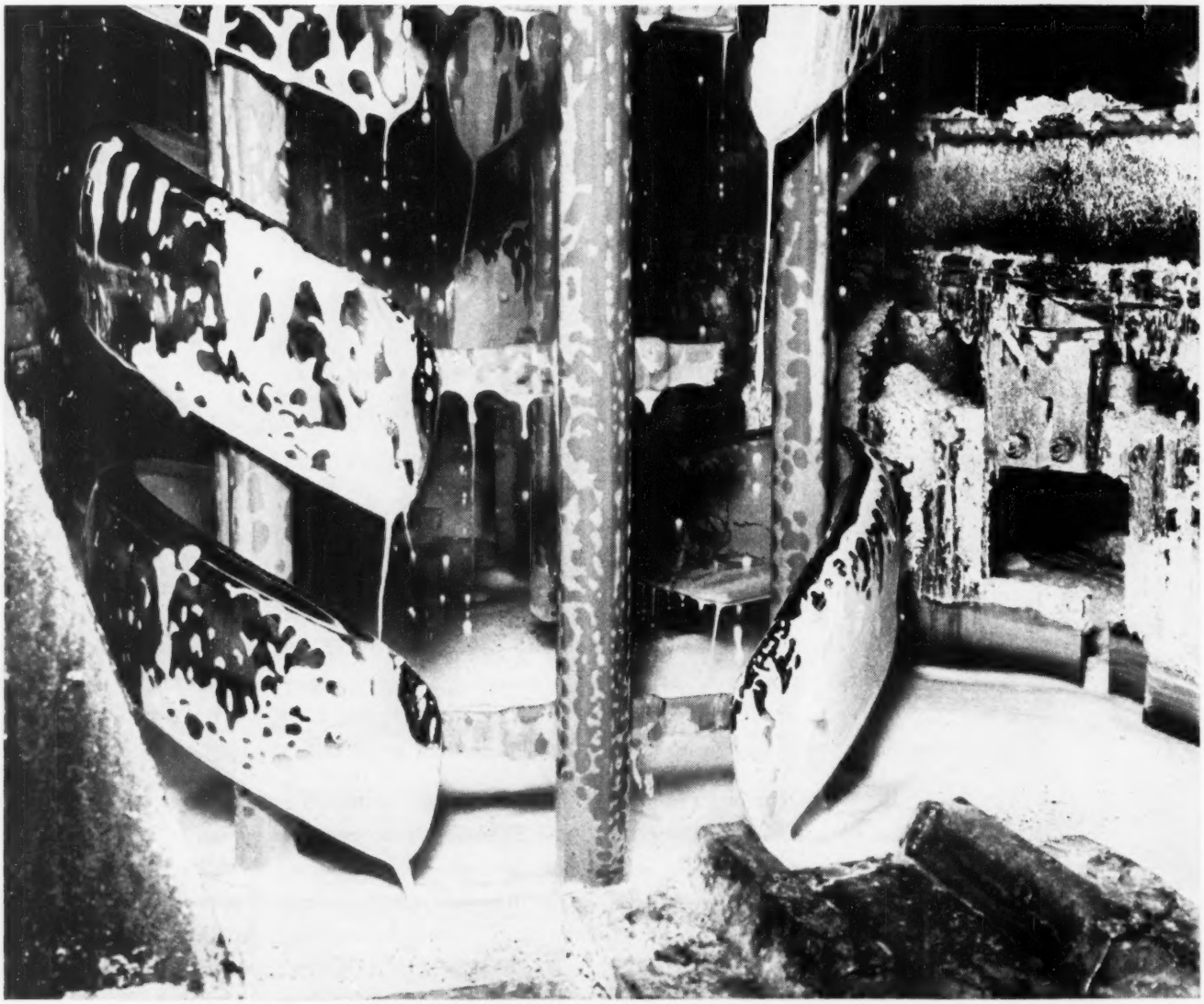


American Buff Company

2414 S. La Salle Street Chicago 16, Illinois

AMERICAN BUFFS ARE REGULARLY ADVERTISED IN FORTUNE MAGAZINE

DOW



Auto bumper wings get fast, thorough stripping in Dow Sodium Orthosilicate to remove buffing compound prior to final chrome-plating. Same effective cleaning compound is used at earlier step in operation, stripping bonder lubrication before bumper is copper-plated.

DOW SODIUM ORTHOSILICATE

strips buffing compounds, other tough contaminants with real speed

Parts reach your cleaning operation carrying heavy residues of buffing or drawing compounds? Strip them good and clean . . . and do it *faster* . . . with high-powered Dow Sodium Orthosilicate metal cleaner.

Dow Sodium Orthosilicate is built and balanced to deliver low-cost, reject-free runs on almost any type of metal part you'll handle. High acid capacity, high pH . . . Dow Sodium Orthosilicate removes oils, fats and waxes with uniform economy whether your cleaning is dip, soak or electrolytic. The extremely high electrical conductivity of Dow Sodium Orthosilicate solutions permits high current density *without* excessive voltage.

Check your present stripper against these points: ready emulsification, no redeposition, fewer rejects, lowered cost per run. Something lacking? Dow Sodium Orthosilicate should do it better. Get that order in *today*. THE DOW CHEMICAL COMPANY, Dept. AL 761J, Midland, Michigan.

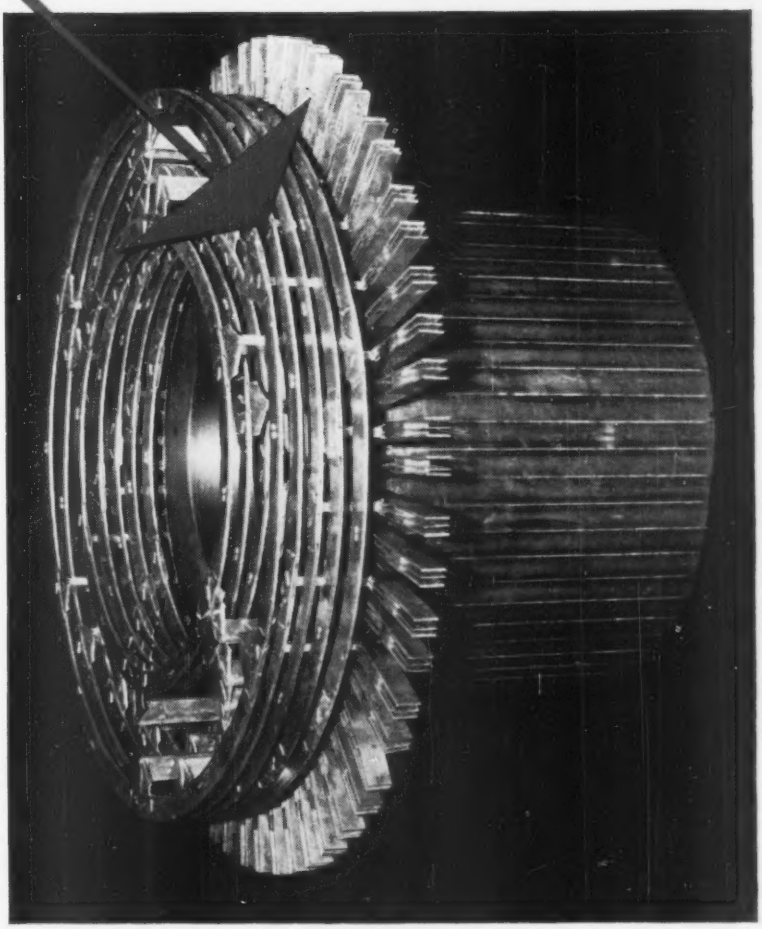
you can depend on DOW CHEMICALS DOW

Why those rings?

they give you a dependable dc supply with far less maintenance

Chandeysson

SOLID COPPER EQUALIZER RINGS ASSURE BALANCED CURRENT CHARACTERISTICS



You can tell a lot about the future of a motor-generator by its equalizer design . . . because proper equalization guarantees you more efficient commutation, uniform voltage and current characteristics, longer brush life and all-around lower maintenance. Chandeysson's sturdy copper bus bar equalizer rings can never fail. Each is separated by a substantial air-gap. . . it will never be necessary to remove the commutators to repair the equalizer connections.

Trouble-saving design features such as these equalizer rings are found only in Chandeysson equipment. Unified responsibility for the manufacture of every component . . . from selected raw materials to the finished product . . . is in the hands of skilled men with decades of experience in building low-voltage generators. Our aim in engineering is to prevent design defects . . . rather than to correct for them. This is why more and more "Industry Leaders Choose Chandeysson!"

MAKE US PROVE to you that a Chandeysson Motor Generator set is your most economical and dependable source of low-voltage dc current. Mail this coupon today.

CHANDEYSSON ELECTRIC COMPANY
4074 Bingham Avenue, St. Louis 16, Mo.

Please send bulletin D-101

Name.....Title.....

Company.....

Address.....

City.....Zone....State.....

CHANDEYSSON ELECTRIC COMPANY • 4074 Bingham Avenue, St. Louis 16, Mo.

83

Iolyte LAMINATED FIBERGLASS FOR CORROSION RESISTANCE

Iolyte TANKS

Fabricated to your Specifications

•

NO MOLDS NEEDED — Made any size, any shape, at no extra cost and no loss of delivery time.

UNIFORM DIMENSIONS — NO TAPERING — Dimensions are same at bottom and top . . . means larger capacities than tapered molded tanks.

FLANGES, DAMS, Etc. — Can be inexpensively equipped with flanged connection, holes, overflow dams, baffles, separations, etc.

CHEMICALLY RESISTANT THROUGHOUT — Fabricated from **Iolyte** sheet properly reinforced. This is a structural material . . . not a lining.

Write for literature, prices, and table of chemical resistance for Iolyte tanks, crocks, ducts.

Iolyte CROCKS

Available from Stock

PRICE LIST

Gal. Cap.	Outs. Diam.	Outs. Hght.	List Cost	Gal. Cap.	Outs. Diam.	Outs. Hght.	List Cost
5	9"	18"	18.00	14	18"	12"	35.00
5	10"	15"	18.00	20	18"	18"	40.00
8	12"	16"	22.00	26	18"	24"	45.00
10	12"	20"	24.00	30	18"	28"	49.00
12	12"	24"	26.00	40	18"	36"	59.00
9	10"	24"	23.00	50	18"	48"	69.00
7	9"	24"	21.00	27	22"	18"	49.00
10	16"	12"	26.00	30	22"	20"	53.00
12	16"	14"	28.00	55	22"	36"	70.00
15	16"	18"	33.00	73	22"	48"	83.00
20	16"	24"	40.00	55	28"	22"	76.00
30	16"	36"	49.00	95	28"	36"	98.00
40	16"	48"	59.00	125	28"	48"	125.00

Iolyte DUCTS

ANY DIMENSIONS ANY CURVES ANY LENGTHS

Iolyte has greater resistance to chemical attack than stainless, Monel, or aluminum. 1/5 the weight of steel, it is superior in tension, flexural, and compression strength. Unlike thermoplastics **Iolyte** will not heat-distort below 350 deg.

Send drawings or prints for quotes and ask for literature giving chemical resistances.

Order from us or your distributor. Unless rated firm, payment with order. No COD's.

ALL PRICES F.O.B. FACTORY

SCHORI PROCESS DIVISION

FERRO CO CORPORATION

8-11 43RD ROAD, LONG ISLAND CITY 1, N. Y.
FACTORY: 59-31 54TH STREET, MASPETH, L. I.

COMING EVENTS

LOS ANGELES BRANCH
Educational Session and Dinner Dance
March 17
Statler Hotel — Los Angeles, Calif.

~

NEW ENGLAND REGIONAL
Educational Session and Banquet
April 7
Hotel Statler — Hartford, Conn.

~

EMPIRE STATE REGIONAL
Second Annual Meeting
April 14
Hotel Statler — Buffalo, N. Y.

~

ROCKFORD BRANCH
Annual Educational Session and Banquet
April 14
Faust Hotel — Rockford, Ill.

~

PITTSBURGH BRANCH
Annual Ladies Night and Dinner Dance
April 21
Gateway Plaza — Pittsburgh, Pa.

~

BOSTON BRANCH
Annual Educational Session and Banquet
May 5
Hotel Statler — Boston, Mass.

~

WASHINGTON BRANCH
44th Annual Convention
June 17-21
Hotel Statler — Washington, D. C.

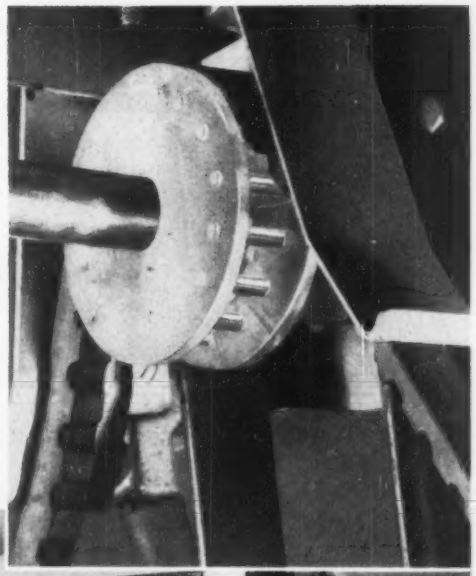
New . . . Exclusive . . .

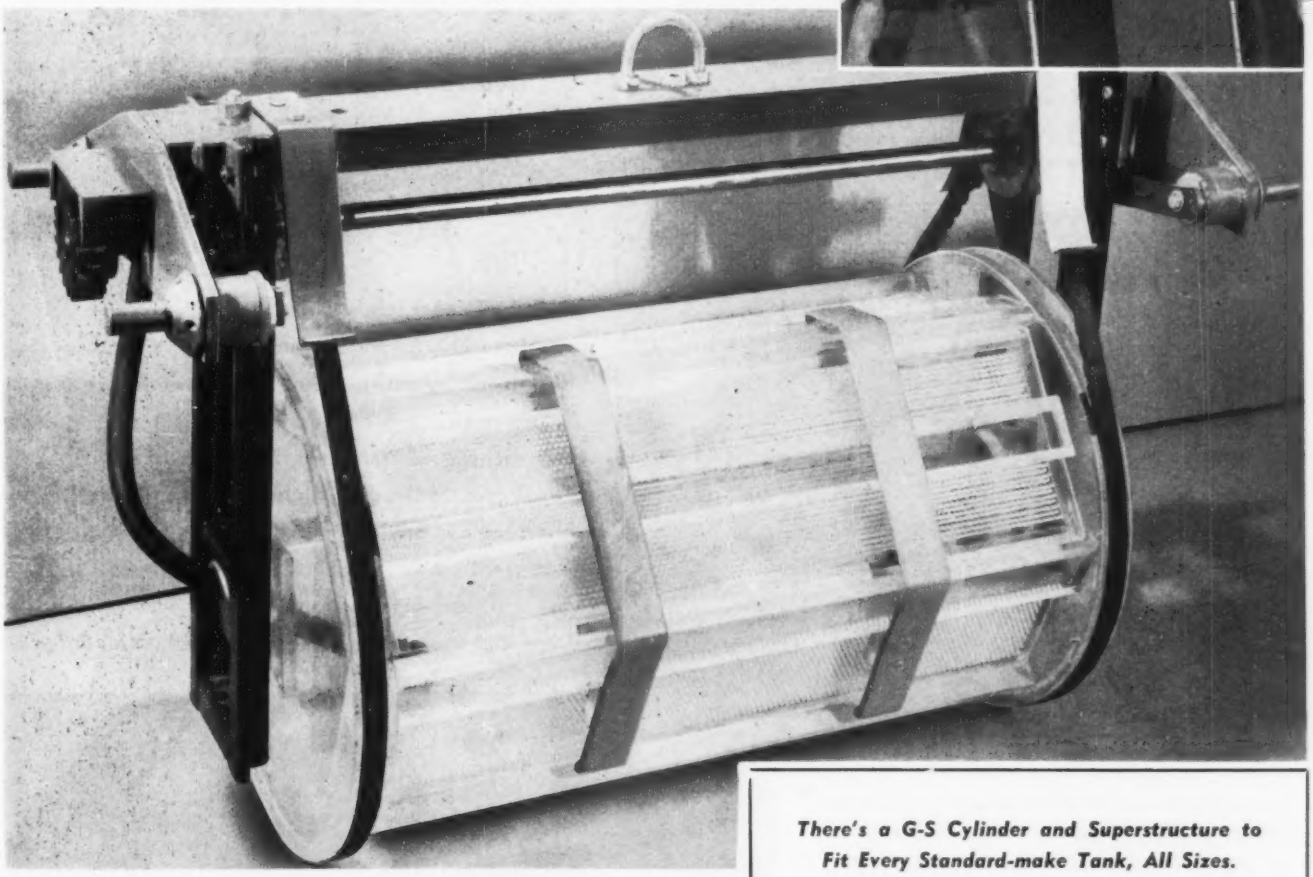
"COGGED-V-BELT"

The BELT-DRIVE with the GEAR-GRIP

Eliminates: Cylinder-End Drive Gear, Idler Gear, Pinion Gear, Bearings

U. S. Pat. 2,562,084. Other Pats. Applied For.





Cuts Costly Gear Maintenance 100%

Another Gill-Singleton exclusive! **Here's your *first* and *only* plating barrel with a belt-drive that doesn't depend on friction-grip alone. G-S "Cogged-V-Belts" mesh with matching cogs in H-T Sincolite Drive Pulleys — can't slip, creep or vary speed. V-belts are molded Neoprene over woven steel tensile members for greater strength. Won't stretch. Belts resist acids, alkalies, floating oil or grease. For all loads — light or heavy — under all conditions. Deliver constant, mechanical-type grip *without gears*. No more gears in solution. No more gear maintenance or replacement.**

Other exclusive features: "Locking U-Hubs" — danglers angled down through hubs won't ride up on load. Quick, easy changing of cylinder and danglers saves hours. Adjustable Bearings, Floating End Plates for constant contact — cylinder can't "rock" in saddles. Total cylinder immersion prevents explosions. No solution contaminants on the equipment. Cylinders of H-T Sincolite or Tempron (hard rubber) fusion-welded, heavy-ribbed construction. See more features than ever before offered.

There's a G-S Cylinder and Superstructure to Fit Every Standard-make Tank, All Sizes.

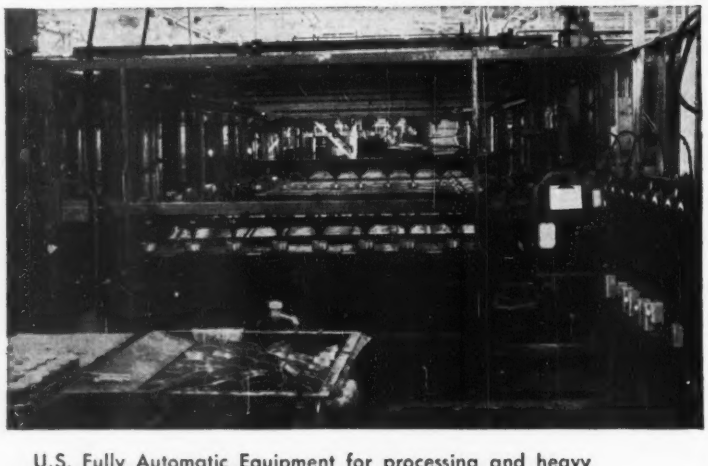
(top inset) Close-up of "Cogged-V-Belt" Drive. (left) Gill-Singleton GSU 14 x 30 cylinder and superstructure for competitive tank.
Cylinders: H-T Sincolite or Tempron (rubber).
G-S makes both, to fit any standard make superstructure, any size. Send details with your inquiry.

Send for Bulletin GSB 101 and Price List.

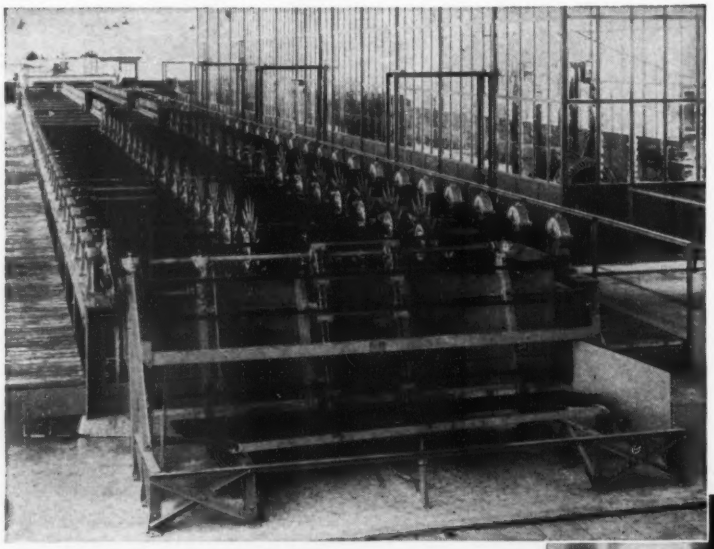
The G. S. Equipment Co.

5317 St. Clair Ave., Cleveland 3, O.
ENdicott 1-0167

New High Standards in Plating • Processing • Cleaning

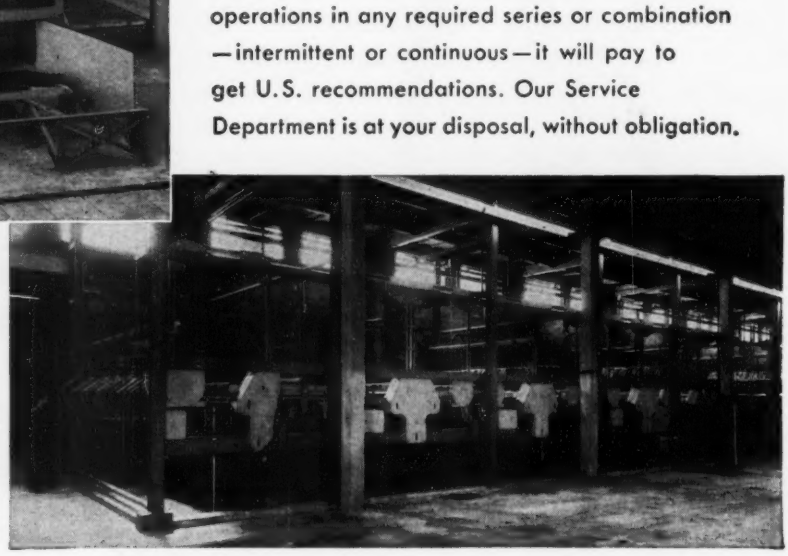


U.S. Fully Automatic Equipment for processing and heavy copper plating the bottoms of popular brand stainless steel cooking utensils. 10 such U.S. installations are in service in 3 plants of this manufacturer.



U.S. Fully Automatic Conduit Pipe Processing Installation. Performs 24 operations in one continuous cycle including cleaning, acid treatment, zinc plating pipe exterior, enamelling and baking interior surface. Capacity—over 60 million feet of pipe per year. Glass enclosure houses U.S. Generator Equipment.

U.S. Automatic Machine for processing tubular steel furniture components. Performs 22 operations automatically including cleaning, copper, nickel and chrome plating and drying in one continuous cycle. Has 5 parallel processing lanes; each can take different kinds of material.

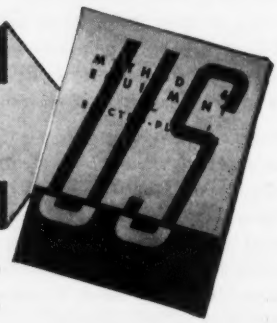


US EQUIPMENT
Since 1896

Provides the Right Combination for More Efficient Operation

U.S. Equipment leads where production problems call for ingenious engineering and design for improving quality and lowering costs. Whether your job calls for Electroplating, Electrochemical Treatment, Metal Cleaning, Pickling, Acid Dipping, Drying or other related operations in any required series or combination —intermittent or continuous—it will pay to get U.S. recommendations. Our Service Department is at your disposal, without obligation.

Write for this FREE Brochure



U. S.—A Complete Line of Plating Barrel, Still Tank, Variable Speed, Semi- and Fully Automatic Equipment • Motor Generators & Rectifiers

U. S. GALVANIZING AND PLATING EQUIPMENT CORP.
31 HEYWARD STREET — INCORPORATED 1896 — BROOKLYN 11, N.Y., U.S.A.

WESTWOOD, N. J.
WHERE PLATERS AND FINISHERS LOOK FOR INFORMATION
FINISHING PUBLICATIONS, INC.

METAL FINISHING

DEVOTED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS

MARCH, 1956 Volume 54 Number 3

FEATURES

Editorial — A Statement of Policy 47

Silver Plating Beryllium Copper 48
By Joseph Haas

Excess Job Shop Costs 51
By K. K. Williams and Carl H. Zamzow, Jr.

Some Tips on Electroforming 56
By Marv Rubinstein

The Capacity of Hexagonal Barrels 60
By J. B. Mohler

Boric Acid Analysis in Nickel Solutions 62
By M. R. Verma and K. C. Agrawal

Finishing Pointers 64

Science for Electroplaters — Part XII 65
By L. Serota

DEPARTMENTS

Shop Problems 68
Patents 70
Abstracts 74
Recent Developments 78
Business Items 95
Associations and Societies 107
Letter to the Editor 115
News from California 115
Obituaries 118
Manufacturers' Literature 119
Equipment and Supplies Advertised in This Issue 126

Published Monthly By

Finishing Publications, Inc.

Established in 1903 as Metal Industry by Palmer H. Langdon 1868-1935.
Also publishers of ORGANIC FINISHING and annual GUIDEBOOKS and DIRECTORIES.

381 Broadway, Westwood, N. J.
WEstwood 5-1530

L. H. Langdon, *President-Treasurer;* Palmer H. Langdon, *Publisher;* Thomas A. Trumbour, *General Manager;* Joan T. Wiarda. *Sales Manager;* Nathaniel Hall, *Technical Editor;* Fred A. Herr, *Pacific Coast Editor;* John E. Trumbour, *Equipment & News Editor;* Inez Oquendo, *Assistant Editor;* Elizabeth Meyers, *Circulation Manager.*

BRANCH OFFICES

Los Angeles 14, Calif.
219 West 7th St.
MAdison 6-5421

Chicago 1
35 East Wacker Drive
FInancial 6-1865

SUBSCRIPTION INFORMATION

United States and Canada $4.00 per year, other countries $8.00. Single copies 45c in United States and Canada, other countries 85c. GUIDEBOOK-DIRECTORY 24th edition 1956 current, 606 pages 5¼x7⅞ $3.50. Please remit by check or money order; cash should be registered. Request for change of address should reach us on or before the 15th of the month preceding the issue with which it is to go in effect. In sending us your change of address, please be sure to send your old address as well as the new one. It is difficult and often impossible to supply back numbers. Copyright 1956 by Finishing Publications, Inc. All rights reserved. Contributed articles, letters on pertinent subjects are invited. Their publication, however, does not necessarily imply editorial endorsement. Re-entered as second class matter June 13, 1940 at the post office at New York, N. Y. under the Act of March 3, 1879.

Member

BPA Business Publications Audit

NBP National Business Publications

Society of Business Magazine Editors

Permanently brilliant Tarnish-Proof Finish...

RHODIUM PLATING SOLUTION BY

BAKER

The name BAKER on Rhodium plating solutions means completely dependable quality and performance every time. Baker supplies standard solutions, or special formulae for individual procedures.

Rhodium produces a metallic finish of sustained brilliance and hardness . . . a finish that never tarnishes, never looks shopworn. The ideal finish for electrical and electronic applications.

FREE BOOKLET: Send for "Electroplating with Rhodium". Contains valuable information and guidance for the electroplater.

BAKER & COMPANY INC PRECIOUS METALS

113 ASTOR STREET, NEWARK 5, N. J.
NEW YORK • CHICAGO
SAN FRANCISCO • LOS ANGELES

ENGELHARD INDUSTRIES

Copper plating process adapts to various needs

What more efficient chromium means

Higher cathode efficiency and wider bright plate range of Unichrome SRHS* Chromium Solutions mean better operations. Users are plating up to two times faster, saving power, stepping up output from existing equipment, and reducing rejects to a remarkable degree. Bulletin SRHS-2 tells more. Send for it.

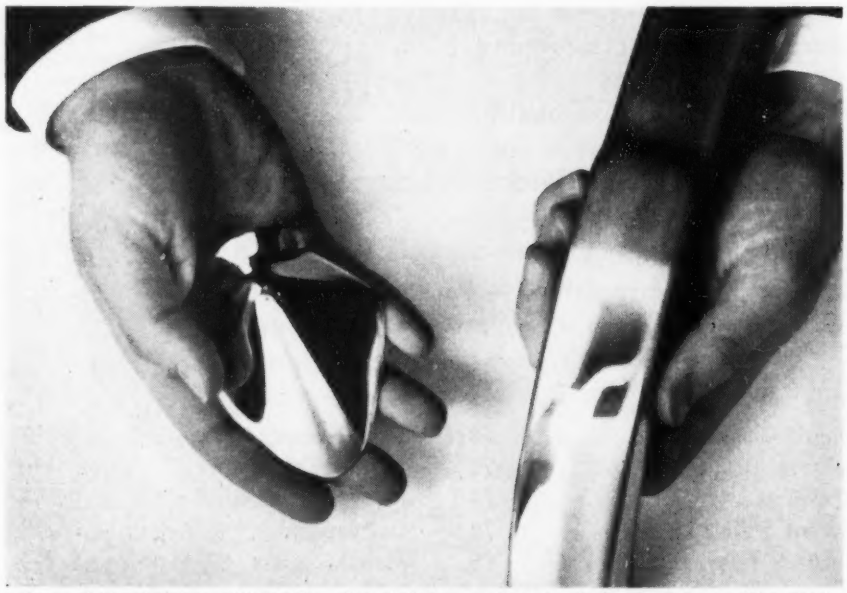
**Trade Mark*

Successful barrel for plating chromium

Small parts are being quality plated easily, quickly and with great economy today in Unichrome 24-inch batch-type Chromium Plating Barrels. Batch plating permits time to be varied to control deposit thickness. The operator loads parts into the drum, unloads from a tray minutes later. Work shows no contact marks, "burning" or "missing." The whole unit occupies only 4x6 ft. floor space.

METAL & THERMIT
CORPORATION
100 East 42nd Street, New York 17, N. Y.
In Canada: Metal & Thermit-
United Chromium of Canada, Limited, Toronto

Non-cyanide Unichrome Pyrophosphate Copper Process provides deposits of unusual nature—users benefit



Two of the finishes obtainable with Unichrome Copper. Left: Lustrous plate that needs no buffing prior to bright nickel. Right: Satin deposit (upper portion of steel part) that buffs fast and easy to a high color (shown on lower portion of part.)

The Unichrome Pyrophosphate Copper Process can be controlled to suit a number of production needs exactly. Newly perfected addition agents, when added to the basic bath, alter the deposit without detracting from its time-proved features.

TO BUFF OR NOT TO BUFF

With one agent, a lustrous deposit is produced which can eliminate buffing. With another, a satin finish is produced which is ideal for buffing – permitting buffing of the free-flowing, ductile copper rather than base metal or subsequent nickel plate.

SMOOTHNESS IS BASIC

Whether used with or without the addition agents, Unichrome Copper deposits are noted for their essential smoothness. In addition, the plating bath has good leveling action, and produces unusually fine grained deposits.

EXTRA BONUS

The Unichrome Pyrophosphate Copper solution contains no cyanide. Its use therefore minimizes the cyanide disposal problem of the plant. As one user recently put it, "a pyrophosphate-type copper solution was selected because of its wide brightness range and because it does not present a serious waste disposal problem."

COMPATIBLE DEPOSITS

Unichrome Copper contributes also to better and more economical copper-nickel-chromium finishing. Its deposit proves ideally receptive for nickel plating, avoiding passivity problems and need for activation treatments.

Send for detailed information.

METAL FINISHING

DEVOTED EXCLUSIVELY TO METALLIC SURFACE TREATMENTS

ESTABLISHED 1903 VOLUME 54 • NUMBER 3 • MARCH, 1956

A Statement of Policy

Readers and advertisers may have noted that our editorial standards are higher than those of some other publications. Having spent the greater part of his life in the industry, this editor feels he can boast a certain degree of familiarity with the interests of the metal finisher, and has charted his course accordingly.

At this time, there is an increasing tendency for manufacturers to deluge editors with press release stories, known to journalists as "puffs," with the purpose of promoting the sale of a product or service. All publications are under pressure from advertisers to print such material, which often takes on the appearance of a technical article, yet is so written as to be a sales pitch in disguise. The policy of METAL FINISHING has been to reserve the feature section exclusively for informative articles, free of any sales motive other than recognition in the field for the author and his company. We personally consider it an imposition when we begin to read what, to all intents and purposes, is a technical article and later find that we have been wasting our time on a publicity release which discloses nothing. And, we are sure many readers share our feelings in this respect.

To warrant publication in our Recent Developments section, which reports on new equipment and supplies each month, we require that these be pertinent as well as new or basically changed. Some publications will report any new piece of equipment marketed by an advertiser and will give a re-run if the manufacturer makes some slight change. Readers who are interested in a new spot welder or punch press will not learn about them from us, even though they might be products of our advertisers, and we do not consider substitution of a stainless steel bolt for a bronze fastener a sufficient improvement to warrant announcement in our pages. Of course, we do not have the time or facilities to investigate new products so that it must be emphasized that claims made in this section are those of the manufacturers. However, our readers are assured that what they see in our Recent Developments section is what the name implies.

Inquiries, some of which are published in our Shop Problems section, are answered so as to treat all suppliers on an equal basis, whether advertisers or not. Our News section is edited in the same way and must meet the test of relevancy, so that we reject stories and pictures of suppliers' booths at trade shows and notice of sales they have made as of no interest to our subscribers.

Our policy is based on service to the reader and no advertising considerations will be permitted to influence this policy. Because of strict adherence to our standards, we have from time to time lost advertisers who were more interested in how many times they could slip in their "plugs" and "puffs" than in the quality of the periodical in which they were advertising. Despite the obvious dependency of a trade publication on advertising, our readers can be sure that their best interests are our first consideration at all times.

Nathaniel Hall

Silver Plating Beryllium Copper

By Joseph Haas, *Industrial Engineer*

Introduction

Q. What is the proper procedure for cleaning and preparing beryllium copper for silver plating?

Q. I have silver plated beryllium copper parts to which I have to solder a copper wire. The silver peels, and the solder will not take hold. What is the cause of this?

Q. Why do we have trouble silver plating parts made of beryllium copper? The silver plate peels either in soldering a copper wire to it, or when put to friction alone?

According to literature published to date, electroplating on beryllium copper alloy is not, or should not be, any problem. The published literature states that beryllium copper is plated as one would plate ordinary copper metal. This is a broad assumption that the general practice of plating upon ordinary copper is correct, and also without consideration of the end uses of either the copper metal or the beryllium copper. However, questions appearing at various times in metal finishing magazines, the above questions being the ones most frequently asked, indicate that plating on beryllium copper is a troublesome problem. This article will not only attempt to answer the above three questions, but will also point out that plating on beryllium copper is different from plating on copper metal and, furthermore, that the general practice of plating on copper metal is incorrect. Most difficulties encountered in electroplating center around the fact that no, or insufficient, consideration is given to the nature of the article being electroplated, and to its end use. In the case of beryllium copper, a knowledge of its metallurgy is definitely of advantage.

Metallurgy of Beryllium Copper

Beryllium is a silver white metal. As a metal, its compounds and chemical activity resemble magnesium, calcium, barium, and radium. Beryllium has certain advantageous properties. It is practically as light as magnesium, has excellent corrosion resistance to air and water, and has a high strength to weight ratio. The chief interest in beryllium centers in an alloy containing 98% copper and 2% beryllium, known as beryllium copper. Beryllium copper, like other copper base alloys, is non-magnetic, offers good electrical and thermal conductivity, and has as good corrosion resistance as copper. But, unlike other copper alloys, it can be heat treated to a high level of strength and hardness. By proper heat treatment, beryllium copper may be made equivalent to the hardest and toughest steels. The importance of beryllium copper depends upon the changing solubility of beryllium in copper with temperature. When the latter is high, but still below the melting point, the copper will dissolve 2% beryllium but, as the temperature is lowered, the solubility falls off until, at room temperature, it is less than 1%.

The useful properties of beryllium copper result from a two stage heat treatment. The first called solution annealing, is usually performed at the mill at 1475°-1500°F. followed by a water quench. Treated in this manner, the beryllium is held in supersaturated solution, and the beryllium copper alloy is fairly soft. In this condition, the alloy can be worked into various forms. The second heat treatment, called aging treatment or precipitation hardening is performed at 550°-750°F. followed by a cooling rate convenient to harden the beryllium copper to a desired level. By altering the time and temperature, it is possible to select various combinations of strength, hardness, conductivity, ductility, and impact resistance.

In view of the hardness attained through heat treatment, the manufacturing practice is to form or machine parts prior to age or precipitation hardening, and place them in fixtures or jigs, so that they maintain their required form and dimensions.

Beryllium copper, requiring no heat treatment, may be ordered mill hardened to a specification and having good formability, close thickness tolerance and an excellent surface.

Pickling and Acid Treatment

Since several heat treatments are usually involved in preparing beryllium copper for specific engineering uses, surface oxidation occurs, varying with the conditions under which the heat treatment is carried out, from a greyish discoloration, and red stains, to a black film. These oxide films can be very tough, due to the beryllium content.

Indiscriminate and vigorous acid treatments should be avoided, because the film is attacked at different rates in various areas and a pitted surface may result, or loss of critical dimensions. It must be stressed that all traces of oxide films must be removed regardless of whether the parts are to be subjected to additional

mechanical operations, or whether they proceed to plating.

Therefore, since the beryllium stock itself is rather expensive, and considerable manufacturing cost has been added to the product, controlled pickling is necessary to condition the beryllium copper parts to a surface free of oxide films. At this stage, the proper pickling solution — one that removes the oxide scale and film with the least amount of attack on base metal dimensions is desirable. Such a pickling solution, following the heat treatment operation, is as follows:

Water	1 gal.
Conc. sulfuric acid	4 fl. oz.
Hydrogen peroxide (30%)	5 fl. oz.
Acetic acid (99.5% glacial)	4 fl. oz.

The cooled, heat-treated parts are immersed in the pickling solution with periodic agitation untill all dark and reddish discolorations disappear. The time in the above pickle depends on its strength (newness), from 2-5 minutes. As the pickle ages, it can be activated by additions of hydrogen peroxide, 2 fl. oz./gal. When hydrogen peroxide additions no longer keep the pickling at a minimum time, it should be discarded.

After pickling to remove oxide, the rinsed parts are then bright dipped in a chromic acid dip made as follows:

Water	1 gal.
Chromic acid	3 lbs.
Conc. sulfuric acid	6 fl. oz.

Parts are agitated to insure uniform attack, keeping time to a minimum (20-30 seconds) to prevent loss of spring pressure and to avoid pitting. Then they are rinsed thoroughly to completely remove chromic acid, and dried. Parts are now ready for electroplating. The chromic acid dipping should not be performed in the same series of water rinse tanks used for the plating cycle. Beryllium copper to be plated may be given different cleaning treatments depending on whether the parts have been heat treated or not.

Parts that have been fabricated by machine or press operations and do not require any heat treatment may be cleaned in the following acid solutions. The parts should first be degreased in an organic solvent, immersed in an alkali cleaner, rinsed in water.

Sulfuric acid	20% by volume
Temperature	150°F.
Time	2 minutes

Rinse thoroughly in water, and then dip in:

Nitric acid	25% by volume
Temperature	room
Time	15 seconds

In both the above acid dips, parts should be thoroughly agitated, thoroughly rinsed in water and dried. Parts are ready for further fabrication, or ready for plating.

Necessity for Plating Beryllium Copper

Although copper and copper-rich alloys, and beryllium copper is one of the latter, are relatively noncorrodible, they do, however, when exposed to even normal atmospheric conditions undergo changes in surface appearance such as loss of luster, staining, and discoloration. Under severer conditions, black and green discolorations occur. Therefore, if for no other reason than appearance, electroplated coatings are applied, especially if the beryllium copper parts are assembled in an exposed position on a piece of equipment.

There are more important reasons for plating beryllium copper which are: (1) To reduce the effect of bimetallic junction due to contact potentials to a minimum, if conditions require such precaution. (2) The copper-rich alloys are difficult to soft solder with noncorrosive resin fluxes when slightly tarnished in storage or during assembly periods. Electroplating with silver eliminates this difficulty. (3) Where low electrical contact resistance and/or high frequency conductance may be involved, silver plating is chosen to solve these problems. The silver plate may be followed with a gold or rhodium plate.

Since plating on beryllium copper serves a functional rather than a decorative purpose the adhesion of the plated coating is of great importance, because adhesion failure usually results in the improper functioning of a piece of equipment. In silver plating beryllium copper, the plating solutions do not cause any hydrogen embrittlement. Therefore, endurance is not adversely affected.

Silver Plating

If a piece of chemically clean copper, brass, or beryllium copper is immersed in a silver solution without any electric current, it will be observed that deposition of silver takes place. This silver deposit, by immersion, is not properly cemented to the basis metal, and any electrodeposited silver upon this immersion deposit will be non-adherent. The writer's experience in silver plating covers the plating of millions of pieces of flatware, hollow-ware, and novelties. In all cases, to obtain proper adhesion of the silver plate producing a high quality product, it was found necessary to apply a preliminary nickel deposit.

To substantiate this practice, the following is quoted from "Principles of Electroplating and Electroforming" by Blum and Hogaboom, 3rd Ed. (1949), pages 300 and 301: *"To retard silver deposition by cementation, the basis metal is coated with another metal that is less reactive toward a silver bath. In plating steel, copper, brass, nickel brass, it is customary to first coat with nickel, and then use the silver strike on the nickel before silver plating."* The beryllium copper parts, racked, wired, or in baskets, are then processed as follows:

1. Electroclean — any mild non-ferrous alkali cleaner, 180°-190°F. reverse current, 20-30 sec.
2. Double water rinse.
3. Immerse in 25% hydrochloric acid, 5-10 sec.
4. Double water rinse.
5. Immerse in 10% sulfuric acid, 20-30 sec.
6. Double water rinse.
7. Cyanide dip — 8 oz./gal. If the subsequent copper solution is of the sodium type, the cyanide dip should be sodium cyanide; if the copper solution is of the potassium type, the dip

should be potassium cyanide. Moreover, this dip should be reserved for beryllium copper processing only, be kept surface clean of dirt and oil films, and not used for general plating processing.

8. Copper strike — 10-15 seconds or until parts are completely covered by a copper film, using cathode agitation, 110°-120°F. 2½-3 volts.
9. Double water rinse.
10. Immerse in 5% sulfuric acid, 5-10 sec.
11. Double water rinse.
12. Nickel plate — any nickel solution, 3-5 minutes, 2-2½ volts.
13. Double water rinse.
14. Silver strike.
15. Silver plate to specification.

The writer was given the problem of investigating why "solder does not flow properly and therefore difficulty is experienced in soldering a copper lead to a silver plated beryllium copper part." Additionally, the silver plate was lifted off by the soldering operation, leaving beryllium copper exposed in that area. Beryllium copper parts silver plated by the writer soldered satisfactorily. The parts complained about were silver plated by an outside source.

Examination of the parts showed (1) patchy and rough silver plate; (2) other parts showed black spots indicative of traces of oxide from heat treatment which had not been removed before plating and, consequently, these spots remained unplated; (3) other parts appeared satisfactory. These latter were heated for three hours at 300°F. Some blistered. Those that were not blistered were cleaned to remove discoloration, scratch brushed as an additional test for adhesion. All of these showed apparent satisfactory silver plating. They were then submitted for soldering, of which 25% did not solder satisfactorily.

The parts rejected in (1) and (2) above were stripped of their silver plate, given a precleaning operation to prepare them for plating, racked and replated by the writer, following the plating cycle given previously. They all soldered satisfactorily.

The next question was to find out why so large a percentage of the vendor's parts did not solder satisfactorily. Consequently, 500 rejected pieces were taken, stripped of their silver plate, and pre-cleaned for plating. Of these 100 pieces were racked and plated with 0.0003" of silver, omitting the nickel plate undercoat. They were submitted to an adhesion test by heating to 300°F. for three hours, cleaned to remove discoloration, and scratch brushed. The silver plate appeared satisfactory. However, when submitted to soldering, they did not solder easily, in that the solder did not flow out thin, but "balled." But the connection to the copper wire was made. The balance of the stripped pieces, 400, were silverplated using the nickel undercoat. All of these soldered easily, perfectly and satisfactorily.

To check further into this matter, a number of experiments were performed on thoroughly clean beryllium copper parts. Fifty (50) pieces were used in each experiment. After silver striking, the parts were plated with 0.0003" thickness of silver. Two silver strikes were used.

Strike #1

Metallic silver	0.6 oz./gal.
Free cyanide	12.0 "

Strike #2

Metallic silver	0.6 oz./gal.
Free cyanide	6.0 "

Experiment	*Feature of Test*	*Silver Striking*
1.	No copper strike; No nickel undercoat	Used #1 strike, immersing in solution, and then making electrical contact.
2.	No copper strike; no nickel undercoat	Used #1 strike, but electrical contact made with a flexible cathode cable before immersing in strike.
3.	Copper strike; no nickel undercoat	Same as in (1)
4.	Copper strike; no nickel undercoat	Same as in (2)
5.	Same as in (1)	Used #2 strike, immersing in solution and then making electrical contact.
6.	Same as in (2)	Used #2 strike, but electrical contact made with a flexible cathode cable before immersing in strike.
7.	Same as in (3)	Same as in (5)
8.	Same as in (4)	Same as in (6)
9.	Copper strike and nickel undercoat	Same as in (1)
10.	Copper strike and nickel undercoat	Same as in (5)

Results of Experiments

After the final silver plating, the parts were rinsed and dried. Visual examination showed no peeling or blistering. The parts were then submitted for soldering. The results of the soldering test were as follows:

Experiment #1—Poor solderability, as solder did not flow smoothly; 60% of the silver plate peeled from basis metal upon application of soldering iron.

#2—Poor solderability, as solder did not flow smoothly; 15% of the silver plate blistered around the soldered area.

#3—Same results as in #1.

#4—Same results as in #2.

#5—All pieces blistered upon attempting to solder.

#6—Poor solderability, as solder did not flow smoothly; 27% of the silver blistered around soldered area.

#7—Same results as in #5.

#8—Same results as in #6.

#9—Perfect solderability and plate.

#10—Perfect solderability and plate.

(*Concluded on page* 61)

Excess Job Shop Costs

Recorded, Controlled and Reduced

By K. K. Williams, *President, S. K. Williams Company, Milwaukee, Wisconsin and*

Carl H. Zamzow, Jr., *Partner, S. J. Fecht & Associates, Chicago and New York.*

ABOUT a year ago, the S. K. Williams Co., a Milwaukee job finishing shop with three plants, was faced with the all too common problem of rising labor costs with little or no corresponding increase in worker productivity. The output of the average worker, either due to a lack of his own effort or because of inefficient operational set-ups, had failed to keep pace with ever increasing wage levels.

This problem, serious in itself, was complicated by other factors, such as:

—The emergence of many new competitors in the plating and polishing field.

—Larger companies instituting captive plating and polishing shops within their own factories on a non-profit basis.

—A high break-even point whereby slight fluctuations in sales volume meant the difference between a profit and a loss.

—The difficulties involved in a job shop operation, where production runs are usually varied and of short duration involving new products every day.

—Being located in a highly competitive labor market.

—A desire to provide employees with reasonable job and financial security.

Many ways were considered by which this problem and all of its complications might be met but, rather than increase charges to customers, or decrease margin of profit which was not excessive as it was, it was decided to maintain or lower costs by:

1. Reducing the waste of manpower and materials.
2. Controlling costs through simple standard costs based upon fair and equitable production standards.
3. Increasing individual employee earnings through increased productivity by means of an equitable wage incentive plan.

In the early part of 1954, a firm of consulting management engineers was called in to help start a program to reduce and control costs in the above manner.

Results of the Program to Date

Since the inception of this program, which was a little over a year ago, the results attained have shown the real success of the work done (Fig. 1). To begin with, the application of this program was limited to the main plant where the bulk of the work was being done and therefore where most of the problems were.

First, employee productivity has been increased by 53 percent as shown by a comparison of the first quarter of 1955 with the first quarter of 1954. This has been primarily accomplished through the adoption of better working methods, more evenly balanced working crews, and increased effort on the part of the employees to increase their earnings under the incentive plan.

Secondly, employees' earnings have been increased 19 percent when comparing April of 1955 with January of 1954. About 3½ percent of the 19 percent was due to a readjustment of the base rates, and the remaining 15½ percent was due to earning extra pay for extra work by means of the wage incentive application.

Thirdly, costs in terms of productive and non-productive labor together, were reduced from 54 percent to 37 percent of the sales dollar as shown again by comparing the first quarters of 1954 and 1955. Upon a further breakdown, the productive labor was reduced from 43 percent to 27½ percent of the sales dollar and the non-productive labor from 11 percent to 9½ percent. These figures have been adjusted to comparable sales volumes, and reflect a decided reduction in the break-even point.

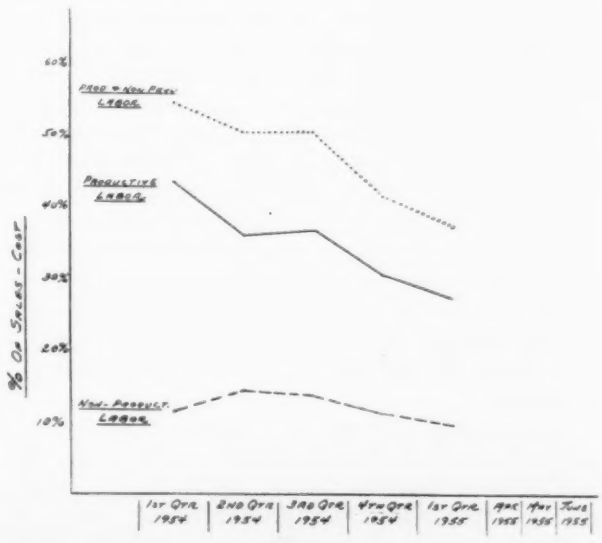


Figure 1.

DAILY WORK TICKET S. K. WILLIAMS CO. Date / /55

Name Clock No. Dept. Polishing

Customer	Part No.	Dimensions	Plate Type	Polish Grit No.	Type of Buff	Number of Pieces	Min. per Piece	Total Std. Min.	Total Actual Min.	Start Time

* = Rework (Show under "Part No.")
( ) = Non-Std. (Show under "Actual Min.")

Total Delay Min.	Total All Min.	Total *Rework Min.	Total (Non-Std.)	Total Std. Min.	Total on Std.	Eff.
						%

Figure 2.

It is felt that these results, which are more than satisfactory to both management and the employees, are primarily due to the cooperation of management and the employees in carrying out a well engineered program.

Aspects of the Program

After deciding upon obtaining outside help to give the program its initial impetus, the first step was to select a competent young man to help the engineering firm install the program. Beyond the installation, this man was to be responsible for extending the program and maintaining it on his own initiative.

A program of this type must be dynamic and, therefore, adequate provision must be made for broadening it, once it has been started, so that the company and its employees will reap the greatest benefits.

It was realized that this new man, even with outside help, could not carry out this program entirely on his own. The company believes that the growth of any organization is limited only by the capabilities of its personnel, and that a worthwhile cost reduction and control program must be based upon the premise that the company's employees and their supervisors are best qualified to make methods improving suggestions and to control operating costs. Therefore, the next step was to acquaint the foremen and key employees with the program.

It was recognized that even though company men might be qualified to reduce and control costs, they needed some training in the techniques of solving cost reduction and control problems. They had to be convinced, first of all, that there was a need for reducing costs, and, secondly, that further improvement in methods were possible.

To meet these needs, the foremen were given specialized training in:

1. The logical way to solve any problem, including a cost reduction or control problem.
2. The technique of methods, time, and production studies.
3. How to apply these techniques in solving their own problems and in installing new methods.

Analysis of Methods and Establishment of Production Standards

Prior to setting the production standards, the engineers and foremen analyzed all of the operations, in order to establish the best practical methods.

Methods of operation were analyzed by ascertaining:

1. What path does the product follow in going through the plant?
2. What are the steps in handling the product?
3. Just how is each operation being done?
4. How is the production being scheduled?

After gathering this information and basic data, it was questioned and analyzed. It was then determined what different, better, and more economical ways might be developed to replace the present high cost methods of operation. To find these new and better ways, the following questions were asked:

1. Why is it necessary to do WHAT is being done?
2. Why is it done THERE? Is there a better place?
3. Why is it done THEN? Is there a better time in the process to do this?

4. Why does this EMPLOYEE do it? Could it be done better by another operator in the line?
5. Why is it being done that WAY? Is there an easier way?

As a result of this questioning, many cost reduction possibilities were developed, especially in eliminating unnecessary elements of operations, redistributing work among the employees, and in simplifying the necessary steps.

Then time studies were taken by means of a stop watch on the approved methods of operation. The basic times arrived at were leveled to normal working times and to these were added the necessary allowances for fatigue and personal needs. The final standards were set up in terms of standard work minutes per piece.

Once the production standards were established, a review was made of methods of reporting production and time for the various jobs. To record, reduce, and control excess costs, it was necessary to make sure that the company had sufficiently accurate reporting of time and production on the different jobs. Some improvements were made, the primary one being the installation of a daily work ticket (Fig. 2). These tickets are kept by the individual employees who make a notation of the jobs upon which they work, and punch the time on and off the jobs by means of job clocks. At the end of each day, these tickets are verified by the various foremen, who then turn them over to the industrial engineer for his use in calculating employee productivity.

Establishment of Labor Requirements and the Application of Wage Incentives

The newly established production standards were used as a measure of work for the different jobs and enabled the firm to balance the working crews in accordance with production schedules. This equalizing of work was necessary before the wage incentive standards could be properly applied.

The wage incentive plan is a relatively simple one, so that everybody can readily understand it and calculate his own earnings. The plan pays a 100 percent premium for all production in excess of standard, and guarantees the basic hourly rate if production is less than standard. All delay time over which the employee has no control is not included in the standard; instead, he is paid his guaranteed hourly rate for that time.

The incentive plan has been made a group plan, which not only includes production workers, but also those non-production workers whose work is directly connected to the production process. This method of payment was decided upon because:

1. The operation is a cooperative type of work, where it is advantageous to have everybody working as a team, and not as individuals.
2. The operations are primarily job shop operations. Thus, some of the work will probably always be on a day-work basis. Even though much standard elemental data are used to set standards, there will be some work on which it will not be economical to set standards. On a group basis, employees are more willing to do these daywork jobs, knowing that their earnings at the end of any one day will be comparable to the rest of the employees who may be on standard more of the time.
3. By having most of the groups working at a similar rate of speed, a better work load can be maintained between departments. Many times, when employees are on incentive, the production between departments will become unbalanced because of wide variations in output.
4. The majority of employees felt that they would rather work under a group system.
5. Employees are interchanged frequently between departments, and by calculating on a group basis, individual earnings calculations are simplified and more easily understood by the employees.

Earnings calculations are posted daily in the plant in order that all of the employees can readily see the amount of their incentive pay for the previous day's work.

To see just how the daily group incentive is calculated, the following will serve as an example:

Department	*Hours Worked*	*Hours On Daywork*	*Hours On Standard*	*Earned Hours*	*Percent Effectiveness*
A	32	2	30	34.8	116
B	24	1	23	27.4	119
C	48	—	48	59.5	124
D	42	4	38	45.6	120
E	16	—	16	18.8	117
F	16	—	16	19.1	119
G	32	3	29	35.7	123
H	48	12	36	44.7	124
I	24	2	22	26.0	118
J	56	8	48	57.6	120
Total	338	32	306	369.2	121

$$\frac{\text{306 Hours On Standard}}{\text{338 Hours Worked}} = \text{90.6\% of working time on standard}$$

$$\frac{\text{306 Hours On Standard}}{\text{369.2 Earned Hours}} = \text{121\% effectiveness for the GROUP}$$

The incentive earnings for all of the productive and the non-productive (those whose work contributes directly to the flow of production) workers are calculated relatively to the basic figures of 121% effectiveness and 90.6% of the working time on standard.

A careful study has to be made relative to what daywork should be included in the incentive calculation and what daywork should be excluded. Once this study is made, a permanent policy should be established and made known to the employees.

All of these calculations are made daily utilizing forms #1 and #2, as illustrated. These forms are designed in such a way as to make all details clear to the employees. It is felt that they should know how their earnings are calculated.

S. K. WILLIAMS COMPANY

PLANT #1 ____ WEEK ENDING _____

	MONDAY				TUESDAY				WEDNESDAY				THURSDAY				FRIDAY				SATURDAY			
	Day Work	Time on Rates	Minutes Earned	Percent	Day Work	Time on Rates	Minutes Earned	Percent	Day Work	Time on Rates	Minutes Earned	Percent	Day Work	Time on Rates	Minutes Earned	Percent	Day Work	Time on Rates	Minutes Earned	Percent	Day Work	Time on Rates	Minutes Earned	Percent
POLISHING																								
CHROME CONV.																								
NICKEL CONV.																								
ZINC CONV.																								
C & N ON HILL																								
HAND CHROME																								
CADMIUM																								
BLACK ROOM																								
DAY STILL																								
NITE STILL																								
LINE INSP.																								
RACK REPAIR.																								
PLANT TOTALS																								
OVERALL PERCENT																								
TIME ON RATES																								

Form #1.

S. K. WILLIAMS COMPANY
Daily Premium Earnings

PLANT # _____ WEEK ENDING _____

Clock No.	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		TOT.
	Min. Worked	Prem Earned	Min. Worked	Prem Earned	Min. Worked	Prem Earned	Min. Worked	Prem Earned	Min. Worked	Prem Earned	Min. Worked	Prem Earned	
TOTALS													

Form #2.

Showing and Controlling Excess Costs

The cost control program is based upon the company's production standards and consists of a concise standard cost system coupled with a set of weekly excess cost reports (Fig. 3).

It was known that prices or sales volume could not be controlled to any great extent, so the only recourse was to control cost. Costs had always been controlled to some extent, but it was decided to control them more closely by means of a budgetary cost control.

The present system of standard costs is based upon a combination of "past average best performance" and "production standards." The former is used for all items of expense except productive labor for which the latter is used. Actual against standard costs are reported on a monthly basis in a proper relation to sales volume. The variances shown are used as a basis for cost analysis and reduction.

In addition to indicating variances (especially losses), other advantages were found to standard costs such as:

1. They provide an excellent insight into the causes of waste.
2. They reduce the clerical work associated with cost finding.
3. They facilitate estimating the cost of products.
4. They provide a means for measuring the benefits of cost reduction work.
5. They signal any dangerous trends in the cost and profit relationship.

The weekly "Excess Cost Report" is used more as a means of on-the-spot control of excess labor costs. Corrective action can be taken as a result of this report while the causes of the excesses are still fresh in everybody's mind. This report is very easily made up from the daily incentive calculations which are recapped on the premium earnings sheet.

Conclusions

At the present time, this program is being extended into the remaining two plants. Aside from this, efforts are continuing in the main plant to further improve operations and service to customers.

The program to date, as far as S. K. Williams is concerned, is just a good start. There is still much to be done. A program of this type cannot remain static and still provide the greatest benefits.

S. K. WILLIAMS CO.
WEEKLY
COST CONTROL COLLECTION SHEET

Plant #____ Week Ending____

Dept.	Total Pay	Base Pay	Premium Pay	Overtime Pay	Dept. Eff.	Rework Pay	Delay Pay	Over Time Hours
POLISHING								
CHROME CONV.								
NICKEL CONV.								
ZINC CONV.								
C & N HILL								
HARD CHROME								
CADMIUM								
BLACK ROOM								
DAY STILL								
NITE STILL								
LINE INSP.								
RACK REPR.								
TOTAL DIRECT FOR WEEK								
TOTAL INDIRECT FOR WEEK								

Dept.	Total Hours Worked	Total Hours Non-Std.	% of Total	Total Hours on Std.	% of Total	Total Std. Hours	Total Rework Hours	% of Total	Total Delay Hours	% of Tota
POLISHING										
CHROME CONV.										
NICKEL CONV.										
ZINC CONV.										
C & N HILL										
HARD CHROME										
CADMIUM										
BLACK ROOM										
DAY STILL										
NITE STILL										
LINE INSP.										
RACK REPR.										
TOTAL DIRECT FOR WEEK										
TOTAL INDIRECT FOR WEEK										

Figure 3.

The company believes that there is a definite place for industrial engineering of this type even in small job shop operation. The principles followed are sound and can be applied in any type of industry, but the method and extent of the application to these principles will vary in individual circumstances. Essentially, the success of the program will depend upon:

—Getting off to the right start with qualified help and assistance.
—Making everybody a part of the program in order that all will support it.
—Seeing that the program is put on a continuing basis.
—Letting it get firmly established, before extensive monetary savings are expected.

Some Tips on Electroforming

By Marv Rubinstein, *Metal Finishing Consultant, New York, N. Y.*

This is the second installment of this three-part article. The first part appeared in the February issue. —Ed.

Matrices and Mandrels

It is important that the original matrix or mandrel be made very carefully, since the electrofabricated part will be an exact negative reproduction of this as regards shape, dimensions and surface finish. Matrices are made in a number of standard ways, such as machining, engraving, casting, modelling or hobbing. Sometimes, the original mold is a previously electrofabricated positive. On other occasions, as in the manufacture of injection molds, the original matrix may be an extruded plastic part from a previous run. Some positives are natural objects, such as leaves or grained wood or leather. Others may be special manufactured items, difficult to mass produce, e.g. phonograph record masters or a handmade knitted tablecloth of intricate pattern. Even human skin has been used in making an embossing plate for certain prosthetic appliances.

The materials from which molds and mandrels can be made are even more numerous than the methods. Anything from aluminum to wood has been utilized at one time or another. Below is a list of different materials which have been used. For a better understanding of the problem, these have been subdivided into four major types of mandrels.

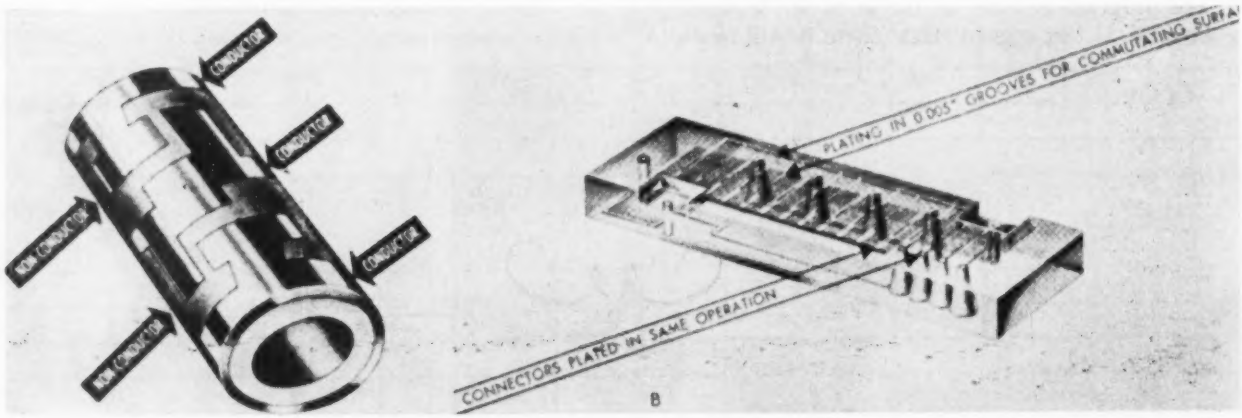
Permanent Mandrels: Steel, chromium plated steel, copper and brass (often nickel or chromium plated), stainless steel, aluminum, nickel alloys (Invar, Kovar, etc.), glass, quartz, rubber, plastics, wood, ceramics, cement, plaster, etc.

Fusible Mandrels: Waxes; low temperature softening plastics; low melting metals and alloys such as lead, tin, bismuth, cadmium and mercury or combinations of these.

Soluble Mandrels: Zinc and zinc alloys, aluminum and aluminum alloys, easily soluble plastics, asphalt (partially fused, partially dissolved).

Miscellaneous Mandrels: Leather, skin, leaves, grained wood, asbestos, cloth, paper, gelatin, pottery, etc.

Permanent mandrels are used wherever numerous copies are to be made from the same matrix and where the matrix is easily separated from the finished product without damage or distortion. It can be seen that this allows for no undercuts or complicated shapes with



(Courtesy Electrochemical Industries, Inc., Worcester, Mass.)

Fig. 6. Superior quality electrical commutators can be made much more simply utilizing an electrofabricating technique. Fig. at left shows a flat commutator surface where the conducting grooves have been electrodeposited, while Fig. at right shows similar results on a rotating commutator.

several bends, but is best for thin walled sections, relatively flat and thick plates or dies, and hollow centered objects concentric around one axis. Permanent mandrels have the advantage of economy (due to their repeated use), a high degree of surface finish and precise dimensional tolerances.

Since they are only used once and then destroyed, fusible mandrels are used for the most part when permanent mandrels are impracticable. This involves articles with complicated surface contours involving multiple bends, undercuts and other complexities — articles which consequently could not be removed from the mandrel without being damaged in the process. Fusible mandrels are also used on certain high production runs where the mandrels can be die-cast in large numbers at a low cost per piece. Pressure die-cast mandrels can be made with high dimensional accuracy and surface finish.

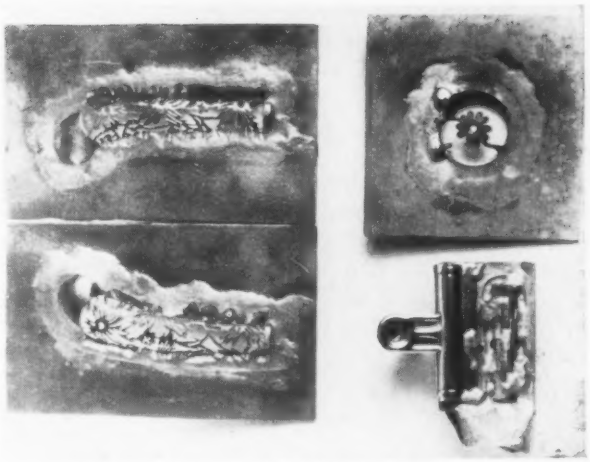
Soluble mandrels find far less use in electrofabrication than do either permanent or fusible mandrels. Their major disadvantage lies in the time normally required to dissolve out the mandrel. Another trouble is that the solvent used sometimes has a detrimental effect on the surface of the finished article. These mandrels are used in applications similar to those requiring fusible mandrels. One disadvantage of both types is that it is sometimes difficult to remove every last speck of the mandrel from the finished part.

Other types of miscellaneous mandrels are used in a number of unusual applications. They usually consist of either natural products or manufactured items whose finish it is desired to duplicate. Normally, they are semipermanent in use, that is to say they are pulled away from the finished item in the same fashion as permanent mandrels, but can only be used once or twice since their surfaces tend to change or be partially pulled out.

In designing the mandrel or, more precisely, in designing the part to be manufactured by electrofabrication, certain rules should be followed to avoid difficulties in plating. Recesses should be kept as shallow as possible as compared to their width, since plating does not throw well in recesses. To prevent bad corners and treeing of deposits, both interior and exterior angles should be made obtuse whenever possible. Or, preferably, they should be rounded out, avoiding corners entirely. Some other considerations of design may involve providing outlets for drainage of solution, avoiding raised voids in positions where they may serve to collect gas and form pockets, providing a stud or screw or some other means of fastening the mandrel to the rack suspending it in the plating solution, and establishing means for separating or easing the separation of the finished part from the mandrel. When soluble or fusible mandrels are being used, some means should be provided for easy admission of the solvent and/or for exit of the dissolved mandrels. Finally, the mandrel should be finished to as high a degree of polish as is required by the finished article, since this precise finish will be exactly duplicated.

Parting Media

As previously noted, most electrofabricated parts must later be removed from the original matrix or mandrel. Thus, it is necessary to provide some form



(Courtesy Electrochemical Industries, Inc., Worcester, Mass.)

Fig. 7. A group of typical electrofabricated shields or spraymasks, used in painting or spraying a repeated pattern.

of 'separator' or parting medium to prevent the plate from adhering too strongly to the mandrel. If the mandrel is a plastic or non-conducting material, a conductive coating must first be applied, and this coating will at the same time serve as a parting medium. For metallic mandrels, three types of parting methods are in common use — mechanical (or organic) films, chemical films, and fusible metal films.

Mechanical films are often organic materials such as paints, varnishes, shellac, lacquers or synthetic rubbers. These may be applied either by brushing, dipping or spraying. They have the advantage of cheapness and simplicity of application but are disadvantageous in that they are too thick, thus destroying detail and dimensional accuracy of the mandrel. They are also non-conductive and so require a subsequent conducting film. Waxes and greases are also used as mechanical parting media. These may be melted and applied by dipping, or they may be dissolved in a volatile solvent (gasoline, carbon tetrachloride, etc.) and brushed or flowed over the surface. Wax has the advantage of filling pores in the mandrel and of giving thinner films than lacquers, but it still shares the same major disadvantages. A mechanical film frequently used in the past but lately losing its popularity is powdered carbon or graphite. The graphite used should have a grain thickness of 0.000002″ or less. It is brushed on to the face of the mandrel, either in a dry state or suspended in water. Care is taken to see that no unseparated lumps of graphite are left in crevices and irregularities and that the excess is washed off under a strong stream of water. The primary difficulty with graphite is that it is slow and messy to apply.

Chemical parting media such as chromates, oxides, sulfides, and iodides are probably the most popular separators being used today. These usually consist of passive metallic compounds which conduct current, but lack adhesion. Some metals, e.g. chromium, nickel, Inconel, Invar and Kovar, form these passive oxides naturally in the air and, consequently, may need no chemical treatment to achieve them. Even in these cases, however, the natural oxide films tend to be uneven and, if used, sometimes result in "stickers," i.e. rejects due to the finished product adhering in spots

to the mandrel. Consequently, it is suggested that the natural films be removed in reverse sulfuric acid (20-50%) bath and a more homogeneous film be applied.

Oxide films may be applied to steel, nickel, chromium and their respective alloys by giving them a reverse current treatment in a standard electrocleaner for steel or a 10% solution of caustic soda. The time required varies with the bath and material, but is normally between 5 seconds and 1 minute. Six volts is usually employed with a current density of from 50 to 100 amp./ft.^{2} When the passivaton is complete the surface is either greyish or brownish in color. Naturally, the mandrel must be properly cleaned before passivation and thoroughly rinsed before subsequent plating.

Chromate or dichromate films may be applied to chromium, nickel, silver, lead, or copper by immersion in any one of a number of solutions of chromic acid or sodium or potassium chromate or dichromate. Standard solutions will run between 0.1 and 1.5 oz./gal. or can be controlled with a Baumé hydrometer. One degree Baumé or slightly less will be about right. When hard water is used, 2 or 3 grams of borax per gallon may also be added. The time of immersion must be determined experimentally, depending on the temperature of the room and on the metal being passivated, but should run from 5 to 45 seconds. Too long an immersion may result in the plated part lifting prematurely from the mandrel, while too short a time often results in sticking. The nature of the passive film, incidentally, is not exactly known. It is thought to be a hydrated chromium chromate compound of indefinite composition.

Sulfide films may be applied to nickel, lead, silver, copper, and bismuth by immersing the mandrel in a solution of sodium sulfide or liver of sulfur. Optimum concentration is 2 oz./gal. for nickel and 1 oz./gal. for the other metals. The solution may also be brushed on if parts are too large for immersion. Timing is again empirical and somewhat more critical in this bath than in the other solutions.

(Courtesy Electrochemical Industries, Inc., Worcester, Mass.)

Fig. 8. An electrofabricated mold used in the slush molding of a child's rubber toy. Since slush molding does not require very high pressures and temperatures, these molds are usually made of copper, but sometimes the interior is coated with electroless nickel to facilitate removal of molded parts.

A silver iodide film may be applied to silver by immersion in a solution of 30 cc. of tincture of iodine per gallon of water. From 10 to 30 seconds is required at room temperature.

Fusible metal separator films are the third type of parting medium in common use, though less commonly applied than mechanical and chemical films. These consist of a thin (0.0001-0.002") plate of a low melting point metal such as lead, tin, cadmium, or one of their alloys. This film is plated on the mandrel, before the electrofabrication begins, and removed by heat, e.g. immersion of the part in hot oil, when the part is finished. Such films are normally used only on permanent type mandrels. Their major disadvantage is their thickness which, though it provides for easy separation, also destroys precision and low tolerances. This can partially be overcome by making the mandrel smaller to allow for the added thickness of the parting medium.

It should be noted that, where difficulty or inconsistent results are met with in finding a parting medium for certain metals, these metals can often be plated or chemically coated with other metals simpler to work with. Thus steel is often plated with chromium or silver, and brass or copper are often plated with nickel and/or chromium or silver. Copper is often also chemically coated with an immersion silver by dipping or brushing. The following formulation, among others, is successful:

Silver nitrate	3	oz./gal.
Sodium chloride	1.5	"
Potassium cyanide	6	"

Immersion deposits other metals, formulas for which will be found in the METAL FINISHING GUIDEBOOK, may also be used, but extreme temperatures should be avoided.

Aluminum mandrels, incidentally, provide just the opposite problem in respect to degree of adhesion. Unless a zincate or anodized coating precedes the electrofabrication operation, coverage may be unsatisfactory and premature separation of the plate from the mandrel may occur. Mandrels made of cast porous metals, e.g. zinc, also provide a special problem in that the pores must be filled in lest they provide focal points for future "sticking." This is often done with wax or lacquers, after which the part is treated as if it were a non-conductor.

As previously noted, mandrels made of non-conductive materials require no special parting medium, since the conductive film provided normally has a low degree of adhesion. The methods for providing this conducive film are adequately covered in the METAL FINISHING GUIDEBOOK section on "Plating or Plastics" and in an excellent little booklet entitled "Metallizing Non-Conductors" by Samuel Wein. Porous materials such as wood, plaster, cloth or some plastics must receive a coating of "filler" material before being metallized. Though many methods of metallizing are used, the

most popular one today is the reduction of a silver nitrate solution. This is often applied by spraying.

Racking and Jigging

The design of racks and jigs as well as the precise method of suspending them in the tank is one of the most important considerations to be dealt with in an electrofabrication operation. Unfortunately, it is also one of the most difficult to describe in a generalized discussion, since almost every installation and even most individual jobs are custom-made to fulfill the specialized needs of the particular operation.

Racks are generally heavier than for decorative plating, and extra care is given in calculating rack core areas since high current densities over long periods are often used and overheating must be avoided. Attention must be paid to seeing that uniform current densities are achieved on all parts of the article or, more precisely, that the greatest current densities be directed to the areas where greater build-up is desired. This is done in a number of ways. Racks are usually firmly attached to bus bars to avoid swinging and shifting of position with regard to anodes. Properly designed inside anodes are placed where needed. This is sometimes combined with additional agitation at these points as, for example, a stainless steel hypodermic needle being used as an inside anode while air is simultaneously being pumped through the needle. Current "thieves" may be utilized to avoid excessive plating or treeing on projecting areas. Insulating shields can be so located as to equalize plating on exposed surfaces and recesses. The writer has even seen arrangements where the anodes faced the insulated back of the article to be plated, so that the metal ions had to travel all the way around, thus approximately equalizing the distances to recessed and open areas. Stop-offs, tapes, rubber guards, and lead foil are generously used where needed to avoid excessive plating.

Even with all these precautions, excessive build-up still tends to occur on many irregularly shaped parts. Thus, it may be necessary to stop the plating every 24 or every 48 hours, remove the part, grind off excessive build-up, and return the part to the bath for continued plating. At such times, "current thieves" heavy with excess plate are also removed and replaced. When such an operation is done, however, during nickel electrofabrication, it must be remembered that nickel will form an oxide film during the period the part is out of the bath and that this film will later cause poor adhesion. This must be prevented, either by giving the nickel a copper flash immediately after removal or by reactivating the nickel plate before returning the part to the bath. With chromium build-up, this problem is even more severe.

It can be seen from the above that uncontrolled current interruptions during extended electrofabrication operations can be extremely serious. Consequently, in parts of the country where current interruptions or generator failures are frequent, it is wise to have an auxiliary power source, as e.g. a gasoline powered generator. This can be installed so as to go into operation automatically, should the current feeding the plating tanks fail at any time. Obviously, this is an expensive precaution, but it often saves much time and money in a large electrofabricating plant.

The problem of excessive build-up at certain areas is one of the biggest headaches in electrofabrication. The problem becomes particularly aggravated when an attempt is made to speed up the plating operation. In addition to the above racking and jigging tricks, it then often becomes necessary to employ other means of using high current densities without the evils of excessive build-up, treeing and turning. High speed cathode rotation and other means of strenuous agitation provides one method. Periodic reverse, interrupted current or superimposed alternating current provides a second. The use of concentrated solutions, wetting agents, and special additives provides a third. In the last analysis, however, it is often found that the only way to reduce excessive build-up on certain shapes is to operate at low current densities. More often, a compromise between maximum speed and optimum metal distribution must be reached. It has often been found advantageous to start plating at reduced current densities until certain irregularities in shape have been filled in. Then, the current can be raised and the rate of deposition speeded up. Here again, trial and error often prove the best teacher.

The Finished Part

When sufficient metal has been deposited, the part is removed from the bath, carefully rinsed, and dried. Racks, current "thieves," etc. are removed and the part is ready for separation from the mandrel. To accomplish this, it is usually necessary to temporarily distort the surface where the mandrel and finished part meet. For thin walled sections, this is often accomplished by flexing the part, using both hands. Sometimes, a mechanical shock such as a tap with a hammer will start the separation. Other times, thermal shock provided by alternate dips in hot and cold water are needed. Trimming interface edges with a saw or on a lathe often helps, or an abrasive belt operation may work both to grind the edges and to give the part a slight shock. Here, however, care must be taken that abrasive particles are not forced into the opening interface where they can cause scratches and damage. With temporary mandrels, separation may of course be accomplished by melting out or dissolving out the mold.

Once the initial "split" has occurred, there may still be areas of sticking or difficult separation between the mandrel and the finished part. To separate these without damage may again require manipulative skill that only practice can give. A slight twist, a tug with just the right force, the insertion of the tip of a knife blade . . . all can be used, but with care and knowledge.

With the finished part completely free, it is then prepared for its ultimate use. This may require machining or sanding the back, polishing the front, cleaning up bad spots, correcting irregularities with an engraver's tool, setting in a bolster or backing up with a cast mold, or any of a number of other operations. During all of this, care should be taken not to scratch or distort the part. Some of these operations, e.g. machining, are often carried out before separation from the mandrel to help prevent distortion. The electrofabricated part is now ready for use.

(To be concluded next month)

The Capacity of Hexagonal Barrels

By J. B. Mohler, *Consultant, New Castle, Penna.*

THE volume capacity of a plating barrel is merely a matter of the internal volume as a container. The production capacity is another matter. Production capacity depends on the amount of surface exposed to the current, the rate at which this surface is turned over, the limiting current density of the bath and the minimum thickness of deposited metal required.

A fundamental problem in the operation of a barrel, or in ordering new equipment, is to determine or estimate the volume of a load for the most efficient operation. Plating will take place at the periphery of the load. Possibly plating will be a little more effective at the free surface inside the barrel, but it will also take place next to the perforated walls. The total potential-receiving surface is shown in Figure 1. A barrel loaded ½ full will present 5/6 or 83 per cent of the surface of a fully loaded barrel. The barrel that is loaded half full will turn the work over more effectively than for a large load. Figure 1 shows the per cent of the maximum possible surface that will be obtained for various loadings. It can be seen that, for

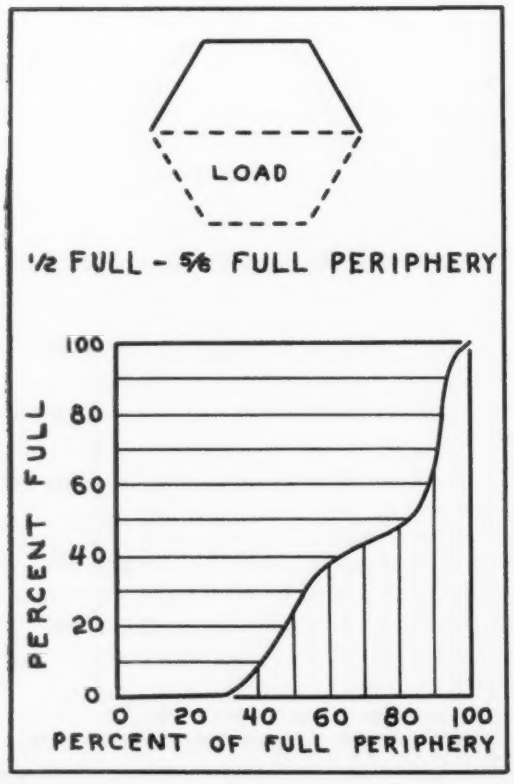


Figure 1.

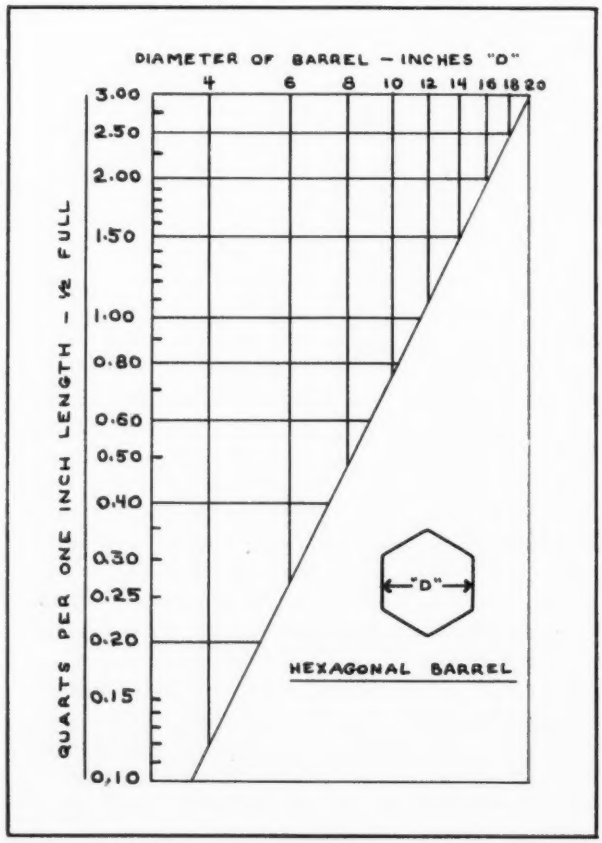


Figure 2.

⅓ to ⅔ of a full load, the exposed area will be 50 to 90 per cent of the obtainable maximum. However the smaller the load the more frequently the parts in the internal mass of the load will be brought to the surface. The optimum loading probably lies between 40 and 50 per cent full and it is much safer to underload than to overload if uniform plating is desired. In view of these considerations a load of 50 per cent full may be taken as a basis for estimating barrel capacities.

The volume in quarts, per inch of barrel length, for various size barrels is shown in Figure 2. If a large diameter barrel is used it will contain a larger mass in proportion to the effective surface. Therefore it will have to be turned over a greater number of times per load than a smaller barrel. For large parts, of course, a large barrel may be most effective, but for small parts a small diameter long barrel should be considered.

Capacity of Hexagonal Barrels ½ Full

Inside Diam. Inches	*Quarts Per Inch*	*Total Quarts ½ Full for Lengths in Inches* 6	12	18	24	36	42	48
3	.067	.20						
4	.12	.72	1.4					
6	.27		3.2	4.8				
8	.48		5.8	8.6				
10	.75			13.5	18.8			
12	1.08			19.4	26.0	39		
14	1.47			26	35	52		
16	1.92				46	68	80	
18	2.43				58	88	102	
20	3.00				72	108	126	
24	4.32					155	181	207

The table shows the calculated capacities for hexagonal cylinders of various lengths when loaded ½ full. These capacities are for inside dimensions and only apply if the barrel is defined in such terms.

It is helpful to have a conception of the total surface for a load of work. Figure 3 shows how the total surface area varies with the size of the piece to be plated. The calculations were based on touching spheres which is not the most compact form for this shape. It can be seen that, as the dimension of a part is halved, the area doubles. Therefore, for parts of proportional dimensions, the ampere-hours required will be inversely proportional to a linear dimension of the part. This simple relationship can be used to estimate the quantity of current required for similar proportions and the same volume or weight of work per load.

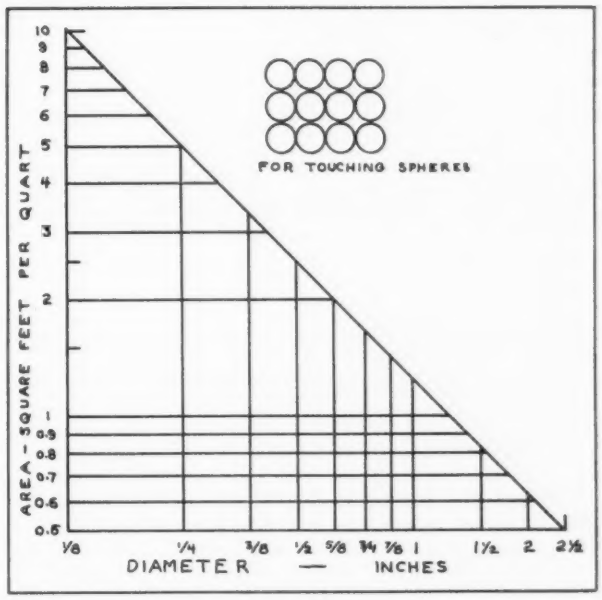


Figure 3.

Acknowledgment

The graphical definitions for capacities of hexagonal barrels were inspired by a well known lecture by *Mr. Burton Daw.*

SILVER PLATING BERYLLIUM COPPER

(*Concluded from page* 50)

Some months later, another complaint was received regarding the solderability of a new lot of silver plated beryllium parts. Samples were checked for adhesion by heating for 3 hours at 300°F. and scratch brushing. The silver plate was satisfactory. Two lots of 50 each of these parts were taken. One was stripped and replated with silver with an undercoat of nickel. The other was plated with nickel over the already existing silverplate, and then finished up in the silver solution. Both lots soldered satisfactorily. Then, an entire lot of 10,000 pieces were replated by nickel plating over the silver, and then silver plating. The solder melted quickly and smoothly.

Advantages and Conclusions

Aside from guaranteeing perfect adhesion of silverplate on beryllium copper, the advantage of nickel as an undercoat, especially if the silver plated beryllium copper parts are to be soft soldered to other parts, is that it acts as a buffer between the highly heat-conductive silver plating and the beryllium copper. Silver is the best conductor of heat; copper is next best, with beryllium copper lower. Consequently, when the tip of a soldering iron at 600°F. is placed against the silver plate with a strip of solder, the heat is rapidly dissipated to the copper, with the result that the solder does not flow smoothly. Nickel, on the other hand, is a poorer conductor of heat, so that the heat of the soldering iron stays in the silver plate at the point of contact, and the solder melts quickly and smoothly.

Relative Heat Conductivities

Silver	100.0%
Copper	89.0 "
Beryllium copper 2%	25.0 "
Nickel	14.0 "

To summarize, the difficulties experienced in the plating of beryllium copper in the order of their occurrence are:

1. Improper pre-plating preparation of parts—incomplete removal of oxide films.
2. Improper silver strike composition, when nickel is not used as an undercoat for silver plate.
3. Lack of a nickel undercoat on parts that have to be soldered.

Boric Acid Analysis in Nickel Solutions*

By M. R. Verma & K. C. Agrawal, *Senior Scientific Officer and Scientific Assistant respectively,*

National Physical Laboratory of India, New Delhi

BORIC acid is used as a buffering agent in nickel plating baths[1,2] and its determination is often required in plating solutions. When present alone, the estimation can be carried out relatively easily, the standard methods consisting of treating an aliquot of boric acid solution with mannitol, glycerol or invert sugar, titrating the same against alkali and determining the end point electrometrically,[3] potentiometrically[4] or by using phenolphthalein as an internal indicator.[5]

Heavy metal ions[6] like zinc, lead, iron, aluminum, nickel, etc., fluorides[7] and ammonium salts are known to interfere in the direct determination of boric acid, and several methods have been considered from time to time for overcoming the difficulty.

Wogrinz and Kudernatsch[8] separated boric acid by distilling it as methyl borate and titrating the acid in the distillate by usual methods. Removal of nickel is effected by electrolysis and titration of boric acid in the residual liquor carried out suitably. In other methods,[9,10] the aliquot is boiled with excess of alkali when ammonium salts are decomposed, and nickel, iron, etc., are precipitated as hydroxides. The solution is filtered, the pH adjusted suitably and boric acid determined alkalimetrically.

In a recently published method, nickel is precipitated as the ferrocyanide,[11] and free mineral acid and boric acid estimated in the filtrate by the usual methods. Advantage has also been taken of the tendency of nickel ions to form complexes with potassium cyanide,[12] substances of the nature of ethylene-diamine tetra-acetic acid,[13] or potassium citrate,[14] when boric acid becomes available for direct determination, without having recourse to separation.

Methods[15] have also been published advocating the direct estimation of the acid without removing the nickel ions; after an initial adjustment of pH and addition of mannitol or glycerol to the solution, boric acid is titrated.

As may be seen, most of the above methods suffer from the drawback of being either too lengthy or require treatment with an expensive or poisonous reagent for complexing. In the direct titration one gets at best a very rough idea of the boric acid content of the solution. Further, it has been shown that, when nickel ions are complexed with potassium citrate, a titratable acidity is obtained[16] and this value depends upon the ratio of potassium citrate/nickel salt.[17] This last fact should necessitate a correction in the apparent value of the titre of the boric acid, which has not been mentioned by Langford.

Workers in this laboratory[18] noted that when potassium oxalate is used for complexing the nickel ions, at a molar ratio of 3:1 of potassium oxalate/nickel salt, the pH of residual solutions is little above 7, so that the volume of alkali solution required for the neutralization of the nickel complex is practically nil

*Reprinted from Electroplating.

Table I. Confirmation of Method in the Presence of Nickel Chloride

Expt. No.	Test Solution: Nickel Chloride Soln. (ml.)	Test Solution: Boric Acid Soln. (ml.)	Water (ml.)	Color with Mixed Indicator	Alkali to make the color of the solution green (ml.)	Potassium Oxalate (ml.)	Mannitol (ml.)	Alkali to Phenolphthalein end point (ml.)	Boric acid: Found (g.)	Boric acid: Actually Present (g.)
1.	—	10	100	Green	nil	nil	25	10.45	0.1197	0.1197
2.	10	1	80	"	"	10	5	1.05	0.01203	0.01197
3.	10	2	80	"	"	10	5	2.10	0.02406	0.02394
4.	10	5	80	"	"	10	15	5.25	0.06015	0.05985
5.	10	7	80	"	"	10	20	7.35	0.08421	0.08379
6.	10	10	80	"	"	10	25	10.45	0.1197	0.1197
7.	25	10	50	"	"	25	25	10.50	0.1203	0.1197
8.	50	10	nil	"	"	50	25	10.55	0.1209	0.1197

Table II. Confirmation of Method in the Presence of Nickel Sulphate

Expt. No.	Test Solution: Nickel sulphate Soln. (ml.)	Test Solution: Boric Acid Soln. (ml.)	Test Solution: Water (ml.)	Color with Mixed Indicator	Alkali of the solution green to make the color (ml.)	Potassium Oxalate (ml.)	Mannitol (ml.)	Alkali to Phenolphthlein end point (ml.)	Boric acid: Found (g.)	Boric acid: Actually Present (g.)
1.	Nil	10	100	Green	nil	nil	25	10.65	0.1220	0.1220
2.	10	1	50	blue	0.15	10	5	1.05	0.01203	0.0122
3.	10	2	50	"	0.15	10	10	2.10	0.02406	0.02440
4.	10	5	50	"	0.20	10	15	5.30	0.06070	0.06100
5.	10	7	50	"	0.20	10	20	7.35	0.08421	0.08540
6.	10	9	50	"	0.20	10	25	9.60	0.10998	0.10980
7.	10	10	50	"	0.20	10	25	10.65	0.1220	0.1220

and the alkali titre of the solution is thus representative of the amount of boric acid.

In the present communication, investigation of a method for the estimation of boric acid in presence of nickel salts has been carried out using potassium oxalate as complexing agent.

Procedure

Known volumes of standard boric acid solutions and nickel chloride or sulphate solutions were mixed and the pH value determined. If the value was below 5.5, it was adjusted to 5.5 by the addition of the requisite amount of alkali solution. For works practice, a mixed methyl red-methylene blue indicator may be used; if the solution is acidic (blue color), alkali is added to make it just green. In our experiments, only the sulphate solutions required an adjustment.

At this stage, excess of potassium oxalate solution was added followed by mannitol solution and 10-12 drops of phenolphthalein as indicator. The titration was carried out against standard alkali, the volume of alkali used being a measure of boric acid content. This may be converted into grams/liter or oz./gallon by the use of appropriate factors.

Reagents and Chemicals

Nickel sulphate: 56.2 g. of C.P. grade salt (hexahydrate) was dissolved and the solution made up to 1 liter.

Nickel Chloride: 47.5 g. of C.P. grade salt (hexahydrate) was dissolved and the solution made up to 1 liter (M/5 approx.)

Boric acid: A known weight of A.R. grade acid was dissolved in carbon dioxide-free water and the acid strength checked by alkalimetric titration.

Mannitol: 10% solution by weight of C.P. grade.

Potassium oxalate: C.P. grade oxalic acid was dissolved in water and the solution neutralized by caustic potash. The solution was made nearly molar.

Phenolphthalein: 1% solution in neutral alcohol.

Methyl red-methylene blue indicator.

1 part 0.2% Methyl red in neutral alcohol.

1 part 0.1% Methylene blue in neutral alcohol.

Sodium hydroxide: C.P. grade material was dissolved in least quantity of water, freed from carbonate and diluted to approximately N/5 strength. It was standardized against oxalic acid.

pH determination was carried out with a glass electrode pH meter.

In the accompanying tables are given some of the typical results that have been obtained. From these, it may be seen that the estimation of boric acid can be carried out accurately by complexing the nickel ions with potassium oxalate which is a fairly cheap chemical and is easily obtainable. The only precautions necessary are to adjust the pH to 5.5 prior to the addition of potassium oxalate and to complete the titration against alkali in the presence of mannitol.

This method is being extended to the estimation of boric acid in solutions containing fluorides and/or ammonium salts. Encouraging results have already been obtained and full details will be communicated shortly.

Our thanks are due to Professor K. S. Krishnan, F.R.S., Director, National Physical Laboratory of India, for his kind permission in allowing this paper to be published.

References

1. Blum, W. and Hogaboom, G. B. 'Principles of Electroplating and Electroforming,' 1949, p. 379, McGraw Hill, New York.
2. Field, S. and Weill, A. D. 'Electroplating,' 1951, p. 299. Isaac Pitman and Sons, London.
3. Mellon, M. G. and Morris, V. N. *Ind. and Eng. Chem.*, **16**, 123 (1924).
4. Mousa, A. A. *Analyst*, **76**, 96 (1951).
5. Kolthoff, I. M. and Stenger, V. A. 'Volumetric Analysis,' Vol. II, p. 114 *et seq.* Interscience Publishers, 1947.
6. Schaefer, H. and Sieverts, A. *Z. Anal. Chem.*, **121**, 161-9, 170-83 (1941).
8. Wogrinz, A. and Kudernatsch, G. *Prakt. Chem.*, 197-9 (1950).
9. Khotsialova, V. F. *Zavodskaya Lab.*, **6**, 1,020-1 (1937).
10. Tananaev, N. A., Karyakin Yu. V. and Murasheva, V. I. *ibid*, **9**, 1,208-9 (1940).
11. Serfass, E. J., Freeman, R. B. and Pritchard, E. *Plating*, **40**, 59-62 (1953).
12. Smith, G. S. *Analyst*. **63**, 593-6 (1938).
13. Pribil, R. and Wunsch, L. *Chem. Listy*, **46**, 337 (1952). Cf. *Czechoslov. Chem. Commun.*, **18**, 306 (1953).
14. Langford, K. E. 'Analysis of Electroplating and Related Solutions,' 1951, pp. 92-93. *Electroplating*, Teddington.
15. Mohler, J. B. and Sedusky, H. J. *Metal Finishing*, **46**, No. 11, 68-75 (1948).
16. Bobletsky, M. and Jordan, J. *J. Am. Chem. Soc.*, **67**, 1824 (1945).
17. Verma, M. R., Bhuchar, V. M., Singh, Y. P. and Therattil, (Miss) K. J. Private communication.
18. Cf. Ref. 17. Private communication.

Finishing Pointers

Alkaline Tin Plating with Steel Anodes

IT has been mentioned before but is worth repeating, that an alkaline tin bath can often be operated more economically with steel anodes than with tin anodes.

First, let us look at the reasons for using tin anodes. Tin is cheaper per pound as anodes than as tin content in sodium stannate. By the use of tin anodes the sodium hydroxide content of the bath is gradually diminished so that, by additions of sodium hydroxide, the chemical content can be controlled within limits. Since the sodium hydroxide content and tin content can be controlled, the cathode efficiency can be controlled. This makes it possible to set definite chemical limits on the bath and to set a definite time cycle for plating.

If steel anodes are used, it becomes necessary to add 2 to 3 times as much sodium stannate to the bath as with tin anodes. The sodium hydroxide content builds up in the bath and, as it increases, the plating rate drops.

On the basis of the above comparison there is no question that the use of tin anodes result in more economical operation on a large scale. On a large scale it is easier to maintain control and the size of the operation easily pays for the expense of the control. Also it is possible to use the potassium stannate bath if greater bath stability and higher plating rates will pay for the higher price of the potassium chemicals.

Now consider the factors shown in the table. With tin anodes, anode polarization is a critical problem. If the anodes become depolarized, stannous tin is formed in the bath. If the anode current density is high, the anodes will develop a black film and act as insoluble anodes. Sometimes it takes a lot of hand work to remove this black film and get the anodes back to normal. If the anode current density is low, the tin will enter solution as stannous tin and cause rough plating. Also the anodes do not supply enough tin to keep the bath in operation so that some stannate has to be added. Occasional adjustment of the anode area is necessary and, often, a certain number of steel anodes are used to maintain anode control. In addition, a certain amount of the tin forms an insoluble scale on the anodes resulting in uneven anode solution and loss of tin as insoluble compounds.

If steel anodes are used there is no anode problem other than to properly place the anodes to get good current distribution.

If tin anodes are used there is the continual possibility of formation of sodium stannite in the bath. When this forms, there is a loss in production time to treat the bath and to again get the anodes functioning properly. This can be a considerable expense in terms of man-hours lost. With steel anodes there is no problem with the formation of sodium stannite. When tin anodes are used the sodium hydroxide must be controlled in order to maintain anode polarization. With steel anodes, the sodium hydroxide content will increase and evenutally reach an equilibrium. With tin anodes sodium acetate is used as an aid to anode polarization. With steel anodes sodium acetate is not required.

With steel anodes the decomposition of tin compounds is less due to operation with a higher amount of sodium hydroxide. With tin anodes the cathode efficiency is higher due to operation with a lower amount of sodium hydroxide.

In order to determine the volume of production necessary for a bath to operate more economically with tin or steel anodes a careful study is required. Such a study was made with a bath processing 1000 square feet per day. It was found that, with tin anodes, about half as much sodium stannate was required and that the savings in tin would not pay for the time required to care for the anodes. On a larger scale this would not be true. Also, if production were very heavy the problem of increasing sodium hydroxide content might become serious with the use of steel anodes.

When operating on a smaller scale than the example given, the use of steel anodes is definitely economic. Bath control is very simple. Above all that is required is to make sodium stannate additions to take care of the amount of tin that is deposited plus the drag-out loss. No other chemicals are controlled.

Analyses should be made for tin and for sodium hydroxide. The tin should be controlled within defined limits. Analyses should be made for sodium hydroxide and a log kept to determine the concentration at which the sodium hydroxide comes to an equilibrium. Also, after the sodium hydroxide comes to equilibrium, the cathode efficiency or the plating rate should be determined. If the plating rate is too slow, it can be increased by increasing the bath temperature or by increasing the tin content.

A change in bath conditions will result in a new equilibrium concentration for the sodium hydroxide. If the plating rate is increased by increasing the tin content of the bath, the rate of formation of caustic will increase. If the plating rate is increased by increasing the bath temperature the rate of decomposition of the sodium hydroxide will increase. By keeping a log, the best conditions for tin concentration, temperature, and current density can be continued.

Since the bath is operated at low cathode efficiency, an increase in current density will result in a drop in cathode efficiency. This limits the plating rate of the bath, but on the other hand, the cleaning power and the throwing power are superior to the high efficiency baths.

Control of Alkaline Tin Baths

	Tin Anodes	*Steel Anodes*
Anode Polarization:	Very critical	No problem
Stannous Tin:	Critical	Does not form
Sodium Hydroxide:	Careful control	No control
Sodium Acetate:	Controlled	None added
Bath Decomposition:	----------	Less with steel
Cathode Efficiency:	Higher with tin	----------

Science for Electroplaters

12. Ionization of Water

By L. Serota

IN the discussion of ionization, water was considered primarily as a solvent. That water ionizes, yielding hydrogen and hydroxyle ions, was indicated in the description of its acid-base character. The fact that even purest water has conductivity, however small, shows that it is ionized. If, for example, a current of one ampere were to be passed through a cubic centimeter of pure water at 18°C., about one million volts would be required.

The concentration of hydrogen ions in pure water has been determined for different temperatures, by conductivity measurements. Pure water, for conductivity measurements, is prepared by repeated distillation in vacuum. Conductivity determination shows that, at room temperature, pure water will contain one ten millionth of a gram (0.0000001) of hydrogen ions per liter and seventeen ten millionths of a gram (0.00000017) of hydroxyl ions per liter; that is only one gram-equivalent (1 gram or 1 mole) of hydrogen ions H^+ and one gram-equivalent (17 grams or 1 mole) of hydroxyl ions $(OH)^-$ would be present in ten million liters of water. Only one mole of water is therefore ionized in ten million liters (five hundred and fifty-five million moles) of water. One liter of water represents $\frac{1000}{18}$ or 55.5 moles.

(555,000,000 moles) $H_2O \rightarrow H^+$ (1 mole) + $(OH)^-$ (1 mole)

The concentration of these ions in moles per liter may be expressed in a convenient mathematical form as follows:

$[H^+] = [OH^-]$ = one ten millionth mole per liter

$= 0.0000001$ mol/l. $= \frac{1}{10^7} = 10^{-7}$ mol per liter.

Hence $[H^+] = 1 \times 10^{-7}$ mol per liter; i.e. one ten millionth gram H^+ per liter.

$[OH]^-] = 1 \times 10^{-7}$ mol per liter; i.e. seventeen ten millionths gram OH^- per liter.

Since the values of the concentration of the ions are so small, the concentration of the un-ionized water, 55.5 moles per liter, may be considered constant. On this basis a relationship is established for the product of these ions, which is constant and is expressed as:

$[H^+] \times [OH^-] =$ Constant $= Kw$

Substituting, $(1 \times 10^{-7}) \times (1 \times 10^{-7})$; $K = 1 \times 10^{-14}$, so that, in water or in aqueous solution, the product of the concentrations of the hydrogen ion and the hydroxyl ion will be constant at 1×10^{-14}. For pure water or a neutral solution the concentration, therefore, of hydrogen ions and hydroxyl ions must be equal, that is $[H^+] = [OH^-] = 1 \times 10^{-7}$ gram-ion per liter. A one tenth molar hydrochloric acid solution, assuming complete ionization, would contain 0.1 mole hydrogen ions per liter, or 0.1 mole $= \frac{1}{10} = 1 \times 10^{-1}$ mole H^+ per liter. Since the ion product for water $[H^+] \times [OH^-]$ must maintain the constant $Kw = 1 \times 10^{-14}$, a corresponding decrease in the hydroxyl ion concentration should result. This value is determined as follows:

$[H^+] = 0.1$ mol per liter $(1 \times 10^{-1}$ mol /l.)

$[H^+] \times [OH^-] = 1 \times 10^{-14}$

$[OH^-] = \frac{1 \times 10^{-14}}{H^+} = \frac{1 \times 10^{-14}}{1 \times 10^{-1}}$

$= 1 \times 10^{-13}$ (.0000000000001) mole per liter.

Large or small numbers may be conveniently expressed by the use of the power of 10 notation.

$100 = 10^2$;

$0.01 = \frac{1}{100} = \frac{1}{10^2} = 1 \times 10^{-2}$

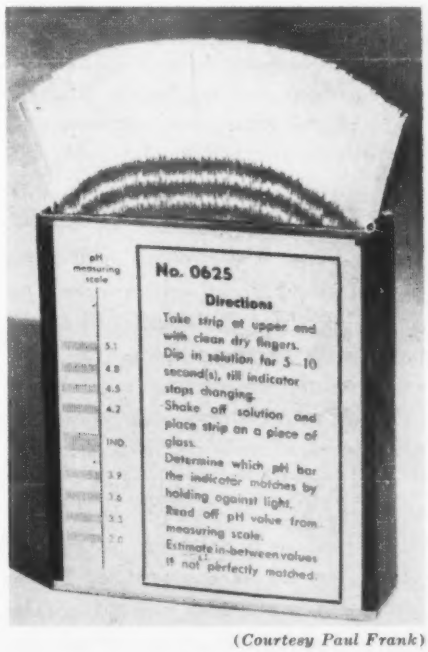
$1000 = 10^3$;

$0.001 = \frac{1}{1000} = \frac{1}{10^3} = 1 \times 10^{-3}$

It is apparent that the acidity or basicity of a solution is a measure of the hydrogen ion or hydroxyl ion. When a solution contains more than 1×10^{-7} mole per liter of hydrogen ions, for example 1×10^{-6} or 1×10^{-4} mole per liter, the solution is acid. When more than 1×10^{-7} mole per liter of hydroxyl ion, for example, 1×10^{-6} or 1×10^{-4} mole per liter is present the solution is basic.

Hydrogen Ion Concentration

The use of negative exponents in expressing hydrogen ion concentrations, as 1×10^{-7} mole per liter, was simplified by a Danish biochemist, S. P. L. Sorenson. By this method, the hydrogen ion concentration is expressed in terms of the hydrogen ion exponent. A positive number was given to the negative power of ten. For the value $[H^+] = 1 \times 10^{-7}$, the negative power or index $^{-7}$ would be expressed as 7. This number represents the pH value (p represents an exponent or power, French *puissance*, German *potenz*); therefore pure water or a neutral solution has a pH value of 7. The advantage of this simple numerical scale is that all ranges of acidity or alkalinity representing solutions containing 1 gram-equivalent of hydrogen ion per liter to 1 gram-equivalent of hydroxyl ion per liter may be conveniently expressed by numbers from 0 to 14. The term pH is defined as the negative


pH measuring scale
No. 0625
Directions
Take strip at upper end with clean dry fingers.
Dip in solution for 5–10 second(s), till indicator stops changing.
Shake off solution and place strip on a piece of glass.
Determine which pH bar the indicator matches by holding against light.
Read off pH value from measuring scale.
Estimate in-between values if not perfectly matched.

(*Courtesy Paul Frank*)

Figure 30.

logarithm of the hydrogen ion concentration.

$$pH = -\log [H^+] = \log \frac{1}{[H^+]}$$

For pure water

$[H^+] = 1 \times 10^{-7}$ gram ion per liter

$$pH = -\log (1 \times 10^{-7}) =$$
$$-\log 1 + \log 10^7 = 0 + 7 = 7$$
$$\text{or} = -\log (1 \times 10^{-7})$$
$$= -(0 - 7) = 7$$

$$pH = \log \frac{1}{1 \times 10^{-7}} = \log 1$$
$$-\log (1 \times 10^{-7}) = 0 - (-7) = 7$$

Table 1 represents hydrogen ion concentrations in an acid solution such as HCl together with the corresponding pH values.

Table 1

Ionic Concentrations

Normality (concentration)	*H+*	*pH*
1	10°	0
0.1	1×10^{-1}	1
0.01	1×10^{-2}	2
0.001	1×10^{-3}	3
0.0001	1×10^{-4}	4
0.00001	1×10^{-5}	5
0.000001	1×10^{-6}	6
0.0000001	1×10^{-7}	7

The relationship between ionic concentration in one gram equivalent per liter and pH at about 25°C. may also be expressed in the following manner.

$[H^+]$:	1	10^{-1}	10^{-3}	10^{-5}	10^{-7}	10^{-9}	10^{-11}	10^{-13}	10^{-14}
pH:	0	1	3	5	7	9	11	13	14
$[OH^-]$:	10^{-14}	10^{-13}	10^{-11}	10^{-9}	10^{-7}	10^{-5}	10^{-3}	10^{-1}	1
pOH:	14	13	11	9	7	5	3	1	0

increasingly acid neutral

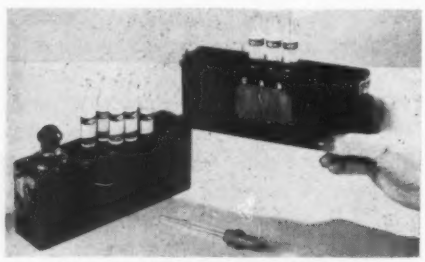
0 ←————

increasingly basic

————→ 14

Colorimetric Tests

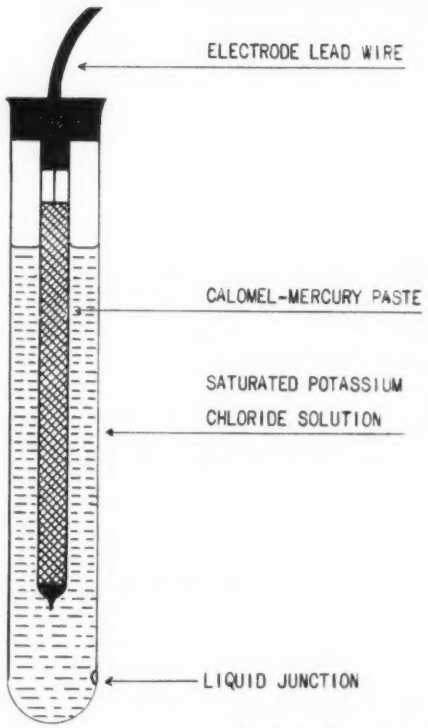
Measurements of pH values are determined by colorimetric (indicator) methods. Colorimetric methods are simple and comparatively inexpensive. The color of certain organic compounds in solution will vary with the pH of the solution. Such compounds are termed, appropriately, indicators. An indicator is a weak organic acid or weak organic base which will show a different color for the ionized (dissociated) form compared to the un-ionized (undissociated) molecule. The indicator phenolphthalein, a weak organic acid, is colorless when undissociated as in an acid solution, and red in the dissociated (ionized) form when in an alkaline solution. pH values determined by this method are subject to several sources of error. Improperly buffered solutions may introduce an error of a full unit. (A buffered solution is one which will resist changes in pH when small amounts of acid and alkali are added.) Another source of error, which is met in solutions within the range of plating bath concentrations, is due to the salt effect (or salt error), caused by the presence of neutral salts. This error is quite pronounced in some types of high pH nickel baths, where a value may be as much as 0.5 pH unit higher than that obtained by the electrometric method. Some colorimetric standards include a salt error of 0.4 to 0.5 pH which must be considered when making comparisons with other methods. The presence of colloids and proteins, such as gelatin, may result in an error up to 0.5 pH when compared to values obtained by the electrometric method. Such factors as color, turbidity, and oxidizing or reducing agents in solutions, are not favorable for making determinations colorimetrically. Temperature, which has a marked influence upon pH, should be the same for the test sample and pH standards.



(Courtesy LaMotte Chemical Products Co.)

Figure 31.

A number of commercial colorimetric units are available for pH determinations. The simplest is the test paper type (Fig. 30) which merely requires spotting of a small strip of the paper with sample solution. The indicator on the paper strip will change to a color that corresponds to definite pH. This method is not as accurate as the colorimetric method employing a slide comparator for pH testing. A number of such units are in use, of which Fig. 31 is an example. Tables containing indicators, including the specific range and color change, are listed in most reference sources. About



(Courtesy Kocour Co.)

Figure 32.

1400 colorimetric indicators are available. A few examples follow:

Indicator	*pH Range*	*Color Range*
Benzo Yellow	2.4 to 4.0	Red to Yellow
Methyl Orange	3.1 to 4.4	Red to Yellow
Paranitrophenol	5.0 to 7.0	Colorless to Yellow
Phenol Red	6.8 to 8.4	Yellow to Red
Thymolphthalein	9.3 to 10.5	Colorless to Blue
Acyl Blue	12.0 to 13.6	Red to Blue

For approximate pH values, a universal indicator may be employed. This type, which is prepared as a single solution, will indicate a pH range from about 3 to 11 (some range from 2 to 10) on the basis of color change. To obtain such a color range four or five indicators which do not interfere with each other may be made up as one solution. The following colors for different pH value will be obtained by mixing equal volumes of 0.1 per cent solutions of methyl red, a-naphtholphthalein, thymolphthalein and bromthymol blue:

pH:	4	5	6	7	8	9	10	11
		orange-		green-		blue-	blue-	red-
Color:	red	red	yellow	yellow	green	green	violet	violet

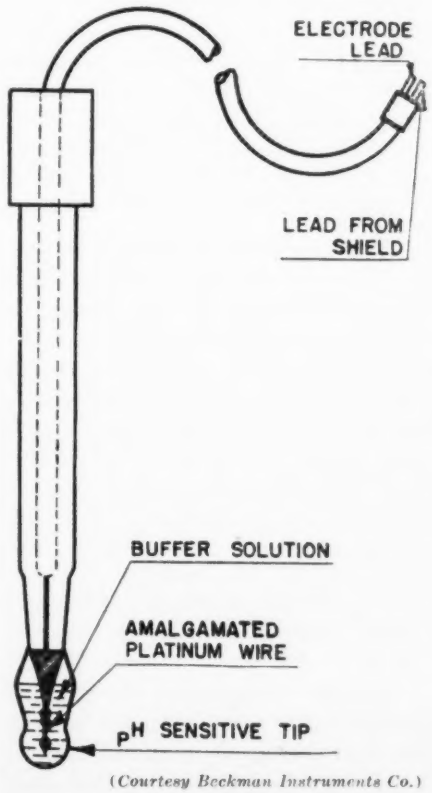
Electrometric Test

Determination of pH values by electrometric methods is based upon the fact that two different electrodes, when immersed in a solution, will develop a potential (emf) based upon the concentration of the hydrogen ions. The total potential developed represents the algebraic sum of the two electrode voltages. Such values (emf) may be

measured with a very accurate voltmeter (potentiometer). It is possible to select one electrode that will maintain a constant potential in different solutions. This type is known as a reference electrode. The potential of the second electrode, referred to as the measuring or pH electrode, will vary with the pH of the solution. Such voltage measurements, depending upon the specific measuring electrode, may be used to determine the pH values directly. Determination of pH by electrometric methods is most important since values obtained by this procedure serve ultimately as the control for results obtained by other methods.

The reference electrode most commonly used is the saturated potassium chloride-calomel electrode (Fig. 32). The half cell potential for this reference electrode (0.1N calomel), compared to the standard hydrogen electrade taken as zero, is 0.333 volt (56°C.).

The measuring electrodes commonly used in industry are hydrogen, quinhydrone, or glass. Although the hydrogen electrode is the primary standard, the skill required in its operation, the time required to reach equilibrium, the ease with which the platinum is poisoned by a number of substances, and the fact that it cannot be employed in solutions that react with hydrogen,



(Courtesy Beckman Instruments Co.)

Figure 33.

make its use impractical for commercial pH measurements. It is used extensively however, for precise measurements.

The quinhydrone electrode represents an oxidation-reduction process, involving in many instances, an exchange of electrons by means of hydrogen ions. The electrode potential will depend upon the hydrogen ion concentration (activity). In this electrode, quinone is reduced to hydroquinone according to the equation:

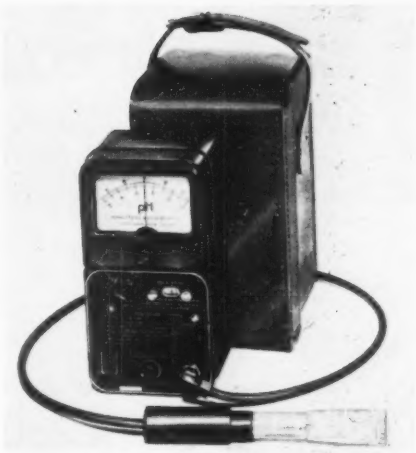
$$C_6H_4O_2 + 2H^+ + 2e \text{ (electrons)} \rightarrow C_6H_6O_2$$

Quinone → hydroquinone

Quinhydrone is a mixture in solution, of equal molecular concentrations of quinone and hydroquinone and will, therefore, react with oxidizing and reducing agents. The slightly soluble mixture is added directly to the solution, the solution stirred, and a clean platinum or gold electrode inserted. This electrode is connected through the external circuit to the reference electrode. Accurate results are obtained in solutions of pH less than 8; above this value the alkali reacts chemically with the quinhydrone. This electrode may be used for solutions containing metal ions that have a harmful effect on the hydrogen gas electrode. A salt error which affects the potential of the electrodes is attributed to the change, due to salts, on the quinone-hydroquinone activity ratio.

Glass Electrode

The most practical measuring electrode for pH determinations is the glass electrode (Fig. 33). It is used with a reference electrode of constant potential, usually calomel. When the electrodes are immersed in the solution and connected through the external circuit, the emf of the cell can be obtained and the concentration of the hydrogen ion (pH) determined. A highly sensitive instrument, such as a vacuum tube potentiometer, is necessary to measure this emf since the voltages are extremely small because of the high electrical resistance (10 to 100 million ohms) of the glass. The glass electrode is widely used because it does not require hydrogen gas as does the hydrogen electrode, nor the quinhydrone mixture required for the electrode of that name. It is especially useful because it can be employed in almost any water (aqueous) solution without having the electrode poisoned or affected by oxidizing or reducing



(Courtesy Analytical Measurements, Inc.)

Figure 34.

substances. It is useful too for colored solutions or organic compounds present as brighteners and wetting agents in plating solutions.

The glass electrode consists of a tube with a thin walled bulb for the bottom. The recommended glass, of low melting point and high conductivity, is a Corning 015 grade consisting of 72 per cent SiO_2, 22 per cent Na_2O, and 6 per cent CaO. The bulb contains a solution consisting of a constant hydrogen ion concentration and an electrode with a definite potential. One such reference mixture is composed of silver and silver chloride in 0.1 N hydrochloric acid. Another consists of a platinum wire immersed in a buffered solution, such as 0.05 molar potassium acid phthalate saturated with quinhydrone.

This electrode operates on the principle that, when a glass surface is in contact with a solution, a potential difference is set up between the glass and the solution, which depends on the concentration of hydrogen ions. The potential of the electrode system is thus determined by the difference of pH of the solutions on either side of the glass wall (electrode). The glass, it is believed, acts as a membrane that is permeable to the hydrogen ions but not to other ions. Accurate values may be obtained in the pH range from 1 to 9. It is not satisfactory for alkaline solutions with a pH above 10. However, a special type of glass electrode has been developed for use in the pH range of 9 to 13.

pH meters are available for convenient and accurate operation in laboratory and plant procedure. A null-point potentiometer type of pH meter (Fig. 34) is commonly used, and controllers are finding extended application in the accurate control of industrial processes.

SHOP PROBLEMS

ABRASIVE METHODS SURFACE TREATMENTS CONTROL
ELECTROPLATING CLEANING PICKLING TESTING

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

Burnishing Compound

Question: I noted in the book "Jewelers Workshop Practices" by Linick mention of the use of "Quillaia" as a burnishing compound. Is this a proprietary compound and, if so, could you please forward the name and address of the manufacturer.

L. P. C.

Answer: "Quillaia" is the technical name for soapbark which is obtained from the Quillaja Saponaria tree of Chile. The bark, which is rich in saponin, was used years ago as a lubricant for burnishing by hand or in barrels and for scratch brushing, superseding stale beer. However, it is rarely employed for barrel burnishing today since most plating supply houses can furnish more efficient compounds.

Eliminating Excess Hypo

Question: When adding hypo to our Rochelle copper solution as a brightener, we miscalculated the amount and got a large overdose. Will you please advise us as to the best way to remedy this trouble?

R. H. W.

Answer: If the solution is heated to just below boiling the hypo will decompose quite rapidly. Oxidizing agents will also eliminate the hypo but are not as safe to use.

Brown Stain on Barrel Nickel Deposit

Question: We are submitting some samples of our barrel nickel plating. Can you give us any reason why or where we are getting these brown stains? We degrease, tumble, clean with sodium cyanide and tri-sodium phosphate, rinse, sulphuric acid dip, rinse, nickel plate, rinse, tumble dry. Our nickel solution contains:

32 oz./gal.	$NiSO_4$
8 oz./gal.	$NiCl_2$
5 oz.gal.	H_3BO_3
32 oz./gal.	$MgSO_4$
pH	5.2
Temp.	120°F.
Time	1½ hours
Voltage	8 volts
Proprietary	brightener

L. L. D.

Answer: This type of brown stain is usually due to rusting of the steel base through an insufficiently thick deposit of nickel or to excess brightener in the plating solution. When the former condition is the cause, the stain will disappear if the part is dipped in muriatic acid and application of copper sulfate solution will produce a film of adherent copper due to the nickel deposit being porous.

We have tested the samples by these methods and have found a good nickel deposit. Therefore, the most likely source of the stain is excess brightener, which should be removed by plating on some scrap for a few hours.

Water Break After Acid Dip

Question: Recently, we have noticed a "water break" on work entering the bright nickel solution of our full automatic plating conveyor. The cleaning cycle is as follows: spray wash, spray wash, reverse electrocleaner, cyanide dip, direct sulfuric acid.

The "water break" appears when the work emerges from the electro-acid, even with a new acid solution. Strength of the acid is 5% by volume. Cleaners are all replaced weekly and rinses are overflowing. Can you explain the appearance of this "water break" on an apparently clean surface?

R. K.

Answer: The water break which forms after work emerges from the acid dip has usually been explained as being due to molecular films of oxide.

Since no trouble is being experienced with peeling of the deposit, the water break is probably due to the fact that there is a significant transfer period in the conveyor travel, which permits oxide formation. This type of water break is ordinarily of no consequence.

Removing Brazing Flux

Question: We are manufacturing a flower box and stand in one unit, with thirty-three brass welds. Our problem is cleaning before painting. The stand is hot rolled steel, and the brazing flux is hard to take off.

L. L. W.

Answer: To remove the brazing flux prior to painting you should use a weak solution of sulfuric acid, about 3-5% by volume, preferably hot. Hot water will also remove brazing flux but more slowly than hot sulfuric acid.

Dropping pH in Nickel Bath

Question: Making use of your Shop Problem Department, we would like to present the following question:

The pH of one of our four bright nickel plating solutions suddenly started going down. After raising it up it went down again, and so for three or four times. Then we decided to switch solutions with another tank — the trouble has not occurred again. Why would the pH of a nickel plating solution go down? Why did the switching of the solutions solve the problem?

B. W. U.

Answer: Dropping of the pH in a bright nickel solution is due to drag-in of acid from the previous acid dip or to polarized anodes. In the latter case, the anodes would become inso-

luble so that metal would plate out of the solution and cause the pH to drop.

We see no reason why switching the nickel solutions should eliminate the trouble, unless during the switch the anode rods were cleaned and anode bags replaced. Clogged anode bags would result in polarizing the anodes, as would insufficient anode surface.

Peeling on Brass

Question: We have recently run into serious trouble in the nickel and chrome plating of our pump assembly unit. Enclosed find two of these units with the defects. This defect of peeling does not manifest itself until two or three months after plating. Our plating cycle is as follows:

1. Slushed up and down in cleaner for 10 seconds, then reverse current for 30 seconds in brass cleaner, 7 oz./gal., 185°-200°F.
2. Cold water rinse.
3. Sulphuric acid dip 10 seconds. Concentration 10% to 20%.
4. Cold water rinse.
5. Copper strike 10 seconds. Copper cyanide solution 3 oz./gal. copper cyanide, 4 oz./gal. sodium cyanide, ½ oz./gal. caustic soda, 165°, pH 12.8-13.4. This solution is about 12 or 13 years old.
6. Cold water rinse.
7. Nickel plate 5 minutes in bright nickel bath. pH 3.6. 40 amps./sq. ft.
8. Two cold water rinses.
9. Chrome plate 1½ minutes at 5 volts.
10. Two cold water rinses. One hot water rinse and air dried 2 minutes.

We also run these in an old cold nickel solution for 2 minutes, 5 amp./sq.ft. with same results.

R. P. S.

Answer: The most likely sources of the peeling condition would be a film on the metal as a result of the buffing and soldering operations, which is not removed by the cleaner, or contamination of the cleaner with chromium carried in on the racks.

For the first condition, best results have been obtained by applying a copper plate for about 3 minutes in a bright, high speed solution after copper striking. The subsequent nickel deposit will be full bright if the copper solution is operated correctly. The caustic content of the copper should be at least 4 oz./gal. as potassium hydroxide.

For the second possibility, it is suggested that the racks be run through a reverse current cleaner to remove the chromium deposit from the tips since the chromium will dissolve into the regular anodic cleaner and contaminate it. The cleaner will also remove chromic acid from the rack surface.

Since the deposit peels down to the brass base, the nickel or chromium solutions would not be the cause, although to be safe, it is suggested that the copper solution be replaced.

pH of Brass Solutions

Question: I am confused concerning a recent article in another magazine with regards to pH on brass solutions. According to the best information we have had, we have always tried to maintain pH 9.5 to 10.5 on brass and, in this connection, we have very recently reduced our brass pH by using much soda. Now, in this article dealing with pH of various solutions, it gives the proper pH for cyanide brass solutions as being 10.5 to 13.0. Can you explain this? We would like to know which is correct.

R. L. S.

Answer: Normal room temperature brass formulas will have a pH of about 10-10.5, while high speed formulations contain sufficient caustic soda to raise the pH as high as 13. Ordinarily, the pH of the common room temperature bath is not controlled but small amounts of ammonia are added regularly for color maintenance.

Professional Directory

HENRY LEVINE & SON, Inc.
Metal Finishing Consultants
Analysis of all electroplating solutions
Engineering of finishing installations
Air Force Certification Tests
Salt Spray Thickness and Adhesion Tests
153 East 26th St., New York, N. Y.
MUrray Hill 5-9427

CONSULTANT
METALLIZING NON-CONDUCTORS
Pioneer in the field of metallizing non-conductors such as plastics, ceramics, glass, etc. for both industrial and decorative applications. Techniques and processes developed during 20 years specialization in the field. Recognized authority with well-known record of achievement.
DR. HAROLD NARCUS
15 Vesper Street Worcester 2, Mass.
Tel. PLeasant 3-5918

G. B. HOGABOOM JR. & CO.
Consulting Chemical Engineers
Metal Finishing — Electrodeposition — Solution analyses. AIR FORCE CERTIFICATION TESTS — Salt spray, thickness of deposits, adhesion.
44 East Kinney St. Newark 2, N. J.
MArket 3-0055

METAL FINISHING CONSULTING SERVICE
TESTING - RESEARCH - DEVELOPMENT
Chemical and Metallurgical Control.
Spectographic, X-ray, Organic.
AIR FORCE CERTIFICATION TESTS.
The FRANK L. CROBAUGH CO.
1426 W. 3rd St. Cleveland 13, Ohio

PROPHON ENGINEERING CO.
Polishing & Buffing Consultants
Originators of the
PROPHON BUFFING METHOD
Office: 545 Fifth Ave. New York, N. Y. MUrray Hill 7-6868
Laboratory: 561 Bond St. Elizabeth, N. J. ELizabeth 2-4409

GRAHAM, CROWLEY & ASSOCIATES, INC.
CONSULTING - ENGINEERING - RESEARCH
Electroplating and Metal Processing
Waste Treatment and Production Problems
SURVEYS - DESIGNS - SPECIFICATIONS
475 York Rd. Jenkintown, Pa.
Also: Chicago - Kalamazoo - New York

SCIENTIFIC CONTROL LABORATORIES
Finishing Consultants—Registered Engineers
Salt Spray—Th ckness Testing—Analyses
PLANNING—RESEARCH—DEVELOPMENT
HAymarket 1-2260
600 BLUE ISLAND AVE., CHICAGO 7, ILL.

THE ANACHEM LABORATORIES
TESTING ANALYSES ENGINEERING
For Metal Finishers
Plating solution analyses and control. Testing of deposit-thickness, composition porosity, tensile strength. Salt Spray tests.
AIR FORCE CERTIFICATION TESTS
1724 West 58th St., Los Angeles 62, Calif.
AXminster 4-1262

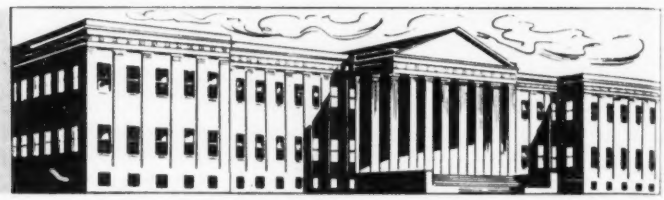
ERNEST J. HINTERLEITNER
5340 RIMPAU BOULEVARD
LOS ANGELES 43, CALIFORNIA
AXminster 4-1531
Research - Engineering - Consulting
1926/1955 - U.S.A. and Foreign

PLATERS TECHNICAL SERVICE, Inc.
ELECTROPLATING AND CHEMICAL ENGINEERS
- Air Force certification tests
- Salt Spray, thickness and adhesion tests
- Spectographic analysis
- Solution, Metal and Salt analysis
- Plant Design and Engineering
- Plant layout and construction
- Industrial waste and water supply treatment

NEW YORK LABORATORY 59 East 4 St., New York 3 ALgonquin 4-7940
CHICAGO LABORATORY 509 S. Wabash Ave., Chicago 5 HArrison 7-7648

Patents

RECENTLY GRANTED PATENTS IN THE METAL FINISHING FIELD



Rotary Abrasive Heads

U. S. Patent 2,713,759. *July* 26, 1955. *R. J. Swan, assignor to Engis Equipment Co.*

A rotary abrasive tool, comprising a main end plate adapted to be detachably mounted on a driving shaft, a plurality of closely spaced dovetail brush socket elements each secured at one end to said main end plate adjacent the circumference thereof and extending parallel to the rotary axis of said main end plate, said socket members together forming a substantially cylindrical array, a plurality of closely spaced outwardly extending brushes detachably mounted respectively in said socket members, a spool attached at one end to said main end plate for relative rotation with respect thereto about said rotary axis, a plurality of abrasive strips wound upon each other on said spool with the free ends thereof extending outwardly between adjacent brushes, an adjustable end plate keyed for sliding movement on the other end of said spool and provided near its circumference with at least one projection adapted for selective engagement with the free ends of said brush socket members, and a screw-threaded clamping member having a shank screw connected to the other end of said spool and a head engageable with the side of said adjustable end plate remote from said main end plate, said clamping member being adjustable between a clamping position in which the adjustable end plate and spool are locked by the projection against rotation relatively to the main end plate and brush socket members and a released position in which the adjustable end plate is axially movable to a position to disengage said projection and thereby permit such relative rotation.

Brush Assembly

U. S. Patent 2,714,738. *Aug.* 9, 1955. *R. O. Peterson, assignor to The Osborn Mfg. Co.*

A rotary brush assembly comprising a plurality of annular discs arranged in axial alignment, aligned notches in the edges of said discs, lengths of brush strip having elongated back portions seated in such notches with brush material extending generally radially therefrom, said lengths of brush strip extending between and inter-connecting said discs, and tabs on said discs at each side of such notches projecting toward each other and also bent generally parallel to one another in the same direction in each alignment closely to overlie such back portions seated therein and thus secure said lengths of brush strip in place, said bent tabs presenting curved surfaces facilitating axial insertion of said strip in such direction.

Belt Polisher

U. S. Patent 2,714,787. *Aug.* 9, 1955. *H. S. Orr, assignor to U. S. Steel Corp.*

An abrading machine comprising an endless abrasive belt, a drive roll for supporting and driving said belt, a work roll for supporting said belt at the position where a workpiece is being abraded, a self-centering roll around a substantial arc of which the belt passes, said self-centering roll having a raised flange thereon adjacent each end, the distance between said flanges being at least as great as the width of the belt, the axes of said rolls being substantially parallel, and means for axially reciprocating said self-centering roll.

Flexible Abrasive Rope

U. S. Patent 2,714,790. *Aug.* 9. 1955. *E. R. Lindenborg, assignor to Vonnegut Moulder Corp.*

An abrasive rope comprising a flexible metallic core structure and a complete covering of granular abrasive material fastened on the surface thereof.

Phosphating Composition

U. S. Patent 2,715,059. *Aug.* 9, 1955. *D. E. Miller, assignor to Kelite Products, Inc.*

A process of producing a dry orthophosphate compound as discrete particles, which process comprises agitating granular anhydrous sodium acid pyrophosphate together with substantially 85% phosphoric acid in proportions of 1 part of the anhydrous sodium acid pyrophosphate to between 1 and 2 parts by weight of the 85% phosphoric acid. the agitation being conducted at a temperature of about 140°F.

Sulfide Coating Stainless Steel

U. S. Patent 2,715,083. *Aug.* 9, 1955. *J. E. Baxter, assignor to Parker Rust Proof Co.*

An acidic aqueous solution which upon contact with the surface of a stainless steel forms a sulfide coating thereon, said solution having a pH between about 6.5 and about 3.3 and consisting of water, between about 0.001 per cent and saturation of the fluoride ion and between about 0.03 per cent and saturation of a sulfur compound adapted to provide sulfide ions at the surface of said stainless steel.

Molybdenum Bath

U. S. Patent 2,715,093. *Aug.* 9, 1955. *S. Senderoff and A. Brenner, assignors to the United States of America.*

A process for obtaining molybdenum that comprises electrolyzing a bath including 15 to 40 per cent, by weight, of potassium hexachloromolybdate (III) and 85 to 60 per cent, by weight, of an alkali halide electrolyte, the electrolysis taking place in an atmosphere of an inert gas.

Plating Slide Fasteners

U. S. Patent 2,715,095. *Aug.* 9, 1955. *C. C. Cohn.*

A method of electrolytically treating slide fasteners of the zipper type having metallic interengaging elements secured to fabric tapes comprising supporting in an electrolytic bath four zipper tapes in the form of a pair of closed zippers by means engaging

only the zipper tapes and not the elements secured thereto with the two closed zippers in flatwise engagement with each other and with the elements of one closed zipper intermeshing with the elements of the other closed zipper, positioning electrodes in the bath adjacent to the outwardly turned side of each of the closed zippers and spaced therefrom, and causing conductive engagement of at least one element of one of said closed zippers and of at most not more than a small portion of the number of elements immersed in the bath with a member carrying current for treatment.

Antimony Bath

U. S. Patent 2,715,096. *Aug.* 9, 1955. *D. G. Burnside, assignor to Radio Corp. of America.*

An electrolytic solution comprising the following proportions:

Antimony trichloride	200-400 grams/liter
Sulfuric acid	130-190 cc./liter
Hydrofluoric acid (52%)	400-600 cc./liter
Water	Balance

Blasting Apparatus

U. S. Patent 2,716,310. *Aug.* 30, 1955. *R. W. Moore, assignor to Pangborn Corp.*

In combination, a blasting apparatus having a work-blasting zone, an opening through which the work is loaded into and unloaded from said zone, guide means formed on at least a portion of the periphery of said opening, and a closure for said opening, said closure comprising a first movable panel having one end mounted on a roller and arranged to move into and out of opening-covering position, said closure being guided in its movement by said guide means, and a second movable panel of pliable material having one end secured to said first panel and the opposite end fixedly positioned remotely from said opening, the movement of the first panel into and out of opening-covering position causing the second panel to move into and out of opening-covering position simultaneously with the first panel.

Buffing Wheel Comb

U. S. Patent 2,716,314. *Aug.* 30, 1955. *C. R. Upham.*

A buffing wheel comb comprising a guide plate having a plurality of rows of openings therethrough, a pin extending through each of said openings, and adjustable means rigidly securing said pins in said openings to compensate for wear on said pins and vary the depth of penetration.

Plating Machine

U. S. Patent 2,716,415. *Aug.* 30, 1955. *J. V. Davis and C. G. Clark, assignors to The Udylite Corp.*

In a machine having means for supporting work-piece carriers in their lowermost position, a liquid treating station including a frame, a plurality of pairs of opposed track sections carried by said frame, the frame being movable between a lower position and an upper position, means for causing said track sections to be aligned with each other in a position to engage and support a carrier when said frame is in its upper position, means for selectively moving each pair of said track sections when said frame is in its lower position between a retracted position and a carrier-engaging position.

Determination of Tin on Tinplate

U. S. Patent 2,716,596. *Aug.* 30, 1955. *D. P. Robertson, assignor to National Steel Corp.*

The method of determining the amount of tin on a sample of tinplate having a ferrous metal base comprising the steps of arranging the sample as an anode in a bath of an electrolytic cell, the reactive constituent of the bath consisting essentially of aqueous hydrochloric acid, passing an electric current through the sample and the bath thereby electrolytically converting the tin to stannous ions, simultaneously bubbling an inert gas through the bath thereby preventing oxidation of stannous ions, and thereafter titrating the stannous chloride-containing bath solution with iodine to determine the amount of tin on the sample.

Rust Preventive Composition

U. S. Patent 2,716,611. *Aug.* 30, 1955. *C. E. Paxton, assignor to Esso Research and Engineering Co.*

A rust inhibiting composition consisting essentially of a major proportion of mineral base solvent oil, about 2 to 8% by weight based on the total composition of, micro-crystalline wax of melting point between 140° and 190°F. and penetration below 40 mm./10 at 77°F., ASTM, as a primary film forming agent, and 0.2 to 3% of a long chain fatty acid partial ester of polyhydric alcohol as a surface active and synergistic rust inhibiting agent, said fatty acid portion of the partial ester containing from about 12 to 22 carbon atoms and said polyhydric alcohol portion is selected from the group consisting of sorbitan, mannitan and pentaerythritol.

Electroless Nickel

U. S. Patent 2,717,218. *Sept.* 6, 1955. *P. Talmey and W. J. Crehan, assignors to General American Transportation Corp.*

The method of chemically plating with nickel the interior of a hollow container formed essentially of an element selected from the group consisting of copper, silver, gold, aluminum, iron, cobalt, nickel, palladium and platinum; which method comprises providing an aqueous chemical nickel plating solution of the nickel cation-hypophosphite anion type having substantially a predetermined composition and characterized by a high plating rate at a temperature within a given range disposed near the boiling point thereof, rotating said container throughout a given time interval about a substantially horizontal axis, maintaining during said rotation and throughout said time interval said container at least partially filled with said solution, and circulating during said rotation and throughout said time interval said solution from the exterior into said container and therethrough and back to the exterior, wherein said solution when introduced into said container has a temperature within said given range, and wherein the rate of circulation of said solution through said container is sufficiently high to maintain the temperature of said fill within said given range and to prevent substantial departure of the composition of said fill from said predetermined composition.

Automatic Conveyor

U. S. Patent 2,716,989. *Sept.* 6, 1955. *C. L. Joy, assignor to Holcroft & Co.*

Apparatus for treating metal articles comprising a receptacle containing a bath and open at the top, an elevator movable into and out of the bath through the open top of the receptacle, a drum supported on the elevator for rotation about an axis

ATLANTIC GREASELESS COMPOUNDS *are unexcelled*

for fast, clean-working
POLISHING & BUFFING OPERATIONS
in the finishing of
METALS, PLASTICS, & WOOD.

Economy-pak foil lined, fibreboard container

ATLANTIC GREASELESS COMPOUNDS are produced by specialists with a background of long experience in the compounding and application of greaseless finishing materials.

The rigidly controlled uniformity of ATLANTIC COMPOUNDS helps you maintain your high finishing standards. This dependable uniformity is assured by the highest grade ingredients and by extremely close quality control in manufacturing.

Devoted exclusively to producing unexcelled greaseless compounds, Atlantic maintains constant research striving for continually improved products. Technical assistance and data available upon request.

Aluminum Tube

THE ATLANTIC COMPOUND CO.
1860 BALDWIN STREET WATERBURY, CONNECTICUT

extending generally perpendicular to the path of travel of the elevator and movable by the elevator into and out of the bath, a second drum rotatably supported to one side of the path of travel of the elevator in a position to register with the first drum in the raised position of the elevator, said drums having the opposite ends open and having means for supporting articles therein, means for transferring articles from the first drum into the second drum when said drums are in registration comprising a pair of slides respectively supported in the drums for sliding movement axially of the drums and having coupling portions between the drums movable into interlocking engagement upon movement of the elevator to its raised position, and means for rotating the drums when the drums are out of registration.

Corrosion Inhibiting Wrapping

U. S. Patent 2,717,196. *Sept.* 6, 1955. *A. Wachter and R. J. Moore, assignors to Shell Development Co.*

A corrosion-inhibiting wrapping material comprising a substantially solid inactive sheet wrapping material having associated therewith in the solid state a compound of the group consisting of nitrophenols and base metal salts thereof, said nitrophenol having a molecular weight of less than about 350 and containing no groups other than nitro, hydroxy and hydrocarbyl groups.

Liquid Blasting Nozzle

U. S. Patent 2,717,476. *Sept.* 13, 1955. *W. M. Myers, assignor to Sanstorm Mfg. Co.*

In a wet-jet sandblast nozzle unit, a nozzle, means to deliver an air-sand stream through the outlet end of the nozzle, a nozzle enclosing unit mounted on the nozzle and including a nozzle head terminating in an outlet having a smaller diameter than the exterior diameter of the nozzle alined with and rearwardly of the nozzle and providing an axially short relatively large diameter chamber in the head between the nozzle and outlet, means forming a longitudinal circumferential and radially narrow passage between the nozzle and head open to the chamber, and means to feed water into the passage back of the forward end thereof.

Waste Treatment

U. S. Patent 2,717,697. *Sept.* 13, 1955. *C. G. Viggers.*

A liquid processing plant including a settling tank for settling from a liquid solids in the form of a sludge, outflow means in said tank for maintaining liquid in the tank at a given level, a sludge flow-off pipe communicating with said tank near the bottom thereof, extending upwardly, and communicating with the atmosphere at a level near but moderately below the liquid level maintained in this tank by said outflow means; said tank having means for concentrating the settled sludge adjacent said pipe; a valve of a quick-acting type capable of alternately opening and closing said pipe positioned near the outlet of said pipe, and means having a cycle approximately as short as one minute for opening and closing said valve in a regular timed cycle with a quickly-complete opening action to provide a maximum flow passage substantially as flow begins.

Metallizing Glass

U. S. Patent 2,717,840. *Sept.* 13, 1955. *C. Bosch, assignor to Fox, Wells and Co.*

A method of forming a coating of metal on a glass surface, which comprises cleaning the surface to remove greases, hydrocarbons, and halogen-containing compounds, applying a solution of an alkali metal silicate to the cleaned glass surface, thereafter placing

upon the glass surface a molten metal product consisting of a member of the group made up of indium and the alloys of indium with tin, lead, cadmium, bismuth, and zinc, which have the glass-wetting properties of indium, and spreading the molten product over the surface to form the coating.

Vapor Phase Inhibitor

U. S. Patent 2,717,843. *Sept.* 13, 1955. *A. Wachter and N. Stillman, assignors to Shell Development Co.*

The method of preparing a substantially solid composition capable of inhibiting metal corrosion in the presence of moisture and air, which method comprises coating a paper with a suspension obtained by mixing water, a dicyclohexylamine phosphate and sodium nitrite in the presence of adhesive casein used in an amount sufficient to bind the resultant mixture to said paper, the amounts of said phosphate and said nitrite being sufficient to form, by ionic interchange, between about 0.05 gram and about 5.0 grams of dicyclohexylamine nitrite per each square foot of paper surface thus coated, and drying the coated paper, said solid composition, when in contact with water, resulting in a liquid phase having a pH value of at least about 6.

Sodium Hydride Descaling

U. S. Patent 2,717,845. *Sept.* 13, 1955. *R. E. Carter*

In the treatment of an elongated metal piece, the method steps including moving the elognated metal piece longitudinally in one direction and successively subjecting successive portions of the metal piece to a plurality of different actions in sequence, as follows: heating by contact with one or more hot gases, a first heating subsequent to the gas heating, immersion in a bath of nonacid descaling liquid material consisting of molten sodium hydroxide and molten sodium hydride, a second heating subsequent to the immersion, and impingement by water sprays .

Hot Dipping Machine for Tubes

U. S. Patent 2,718,474. *Sept.* 20, 1955. *R. W. Hodil and J. L. Holt*

Apparatus for the treatment and coating of tubular elements comprising first tank means for containing flux solution, second tank means for containing molten metal for preheating the tubular elements, and third tank means for containing the molten coating metal, conveyor means for conveying the tubular elements through each of said tank means, and protective enclosure means for said second and third tank means and at least part of said first tank means for enclosing above the contents of each tank means a protective atmosphere, said conveyor means including fixed plates each having a cutaway portion providing an edge over which the tubular elements are moved, rotatably mounted cooperative members provided with tubular element-receiving surface portions predeterminately disposed relative to said fixed plates so as to spacedly hold said tubular elements, said cooperative members having driving means for moving said element-receiving surface portions relative to said plates, said fixed plates being disposed in successively stepped relation and the cooperative members being mounted on an inclined axis so as to convey the tubular elements in slightly inclined relationship, and said protective enclosure means including a depending sealing wall projecting into the first tank means below the level of its contents and in spaced relation to one end wall thereof so that upon entry of the tubular elements into the contents of the first tank means between such one end wall and the sealing wall the air is purged from the tubular elements and upon exit from said first tank means the tubular elements fill with protective atmosphere for passage into the second tank means.

TANK HEATING PROBLEMS ELIMINATED!

CLEPCO FUSED QUARTZ IMMERSION HEATERS

Heating your acid tanks with Clepco Electric Immersion Heaters is the most modern and now the most proven of all methods known today.

ASK YOUR LEADING PLATING SUPPLIERS

OVER 100,000 INSTALLATIONS PROVE CLEPCO FUSED QUARTZ IMMERSION HEATERS ARE BEST

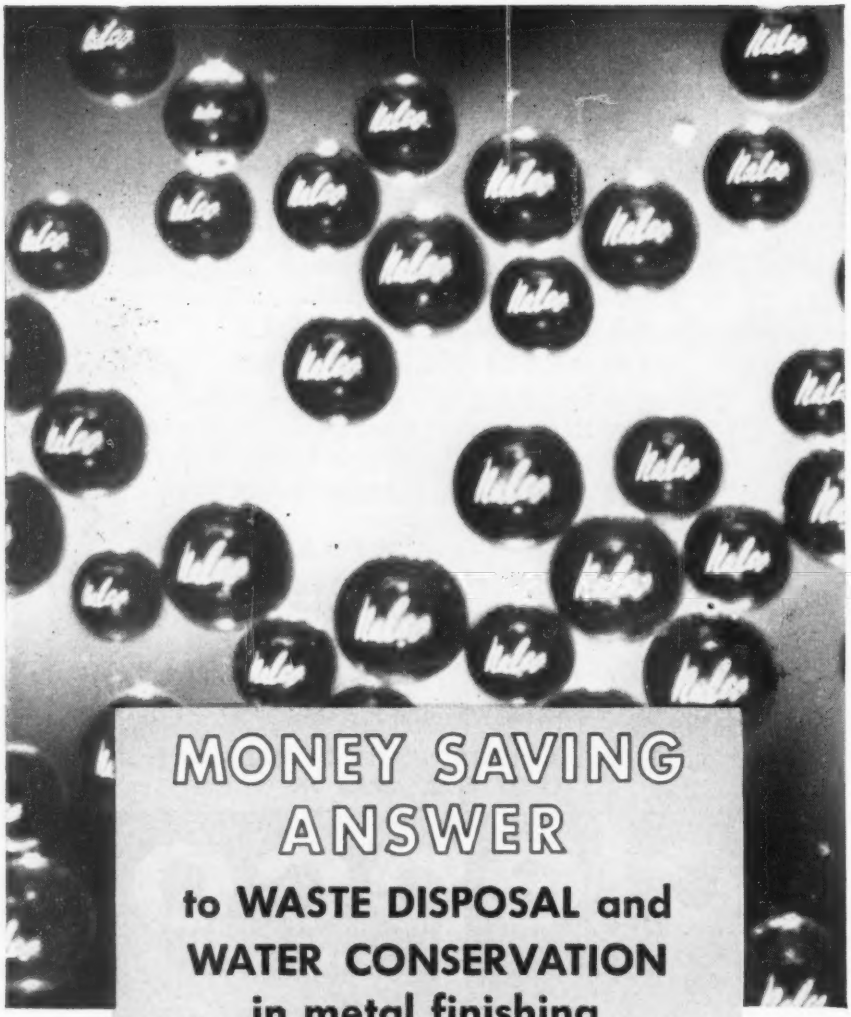
Clepco Steel and Stainless Immersion Heaters are designed to meet the specific demands of the Alkaline Bath heating problems of the Industry.

WHEN A BETTER HEATER IS MADE, CLEPCO WILL MAKE IT.

clepco FUSED QUARTZ IMMERSION HEATERS

SEE YOUR PLATING SUPPLY HOUSE
WRITE US FOR LITERATURE

THE CLEVELAND PROCESS COMPANY
1965 EAST 57TH STREET • CLEVELAND 3, OHIO



● Photomicrographed above are tiny Nalcite® Ion Exchanger spheres—the answer to your problems of waste disposal and effective water conservation in plating and anodizing processes.

Nalco Ion Exchangers can serve you two ways:

Cation exchange treatment of plating solution recovers chromic acid... assures nearly 100% use of chrome, and eliminates complaints about toxic wastes.

Deionization of rinse solutions recovers chrome and eliminates drag-out losses . . . provides pure, reusable water for a perfect spot-free rinse. Cost-wise, Nalco's recovery and reuse program will save you money.

TECHNICAL DATA

Complete technical data on Nalcite Ion Exchangers' performance and characteristics are yours for the asking. Write for Report "Ion Exchange in Metal Finishing."

NATIONAL ALUMINATE CORPORATION

6297 West 66th Place • Chicago 38, Illinois

In Canada: Alchem Limited, Burlington, Ontario

Nalco®

PRODUCTS . . . Serving Industry through Practical Applied Science

Corrosion Preventive Oil

U. S. Patent 2,718,503. *Sept.* 20, 1955. *A. G. Rocchini, assignor to Gulf Research & Development Co.*

A mineral oil composition comprising a major amount of a mineral oil and a minor amount, sufficient to impart corrosoion inhibiting properties to the composition, of a monoamide of an amine having from 1 to 2 hydro-carbon N-substituents at least one of which contains at least 6 carbon atoms and a dimer of an unsaturated fatty acid having from 6 to 22 carbon atoms and containing from 2 to 3 ethylenic linkages per molecule.

ABSTRACTS

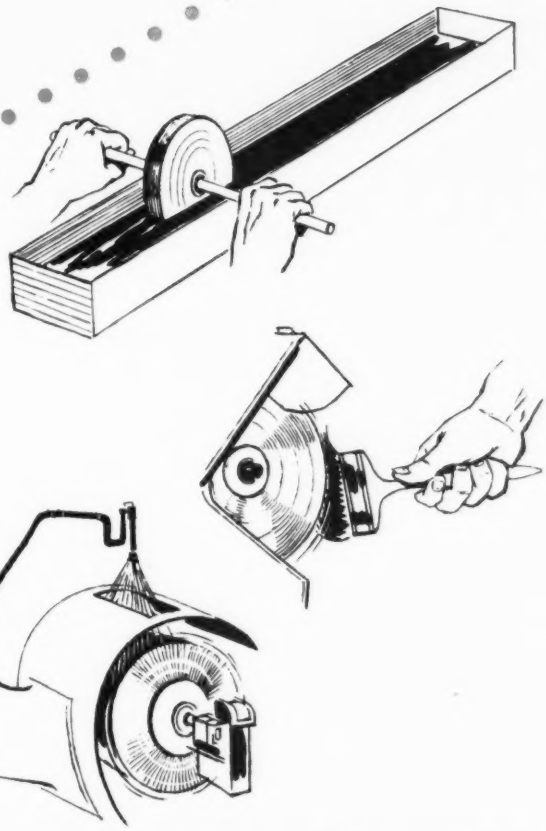
Deposition Conditions and Structure of Compact Electrodeposits

J. Elze: *Metall.* Vol. 9. February 1955. pp. 104-109.

In a previous research covering the deposition of pure copper, the composition of the electrolytes (including addition agents) was found to exercise by far the strongest influence on the crystal growth. The present work covered the study of nickel plating and it was found that an outstanding influence was exercised by the temperature. It had been previously pointed out in connection with nickel deposition that higher temperatures signify increased "secondary" inhibition. The hydrolysis products formed in the immediate neighborhood of the cathode surface during electrolysis influence the crystal growth to a high degree. The composition of the electrolyte has considerable influence on the formation of a definite crystal form but the composition of the electrolyte film which is located in the immediate neighborhood of the cathode, is decisive.

The current density influence on the crystal growth is small. Higher current densities changed the metal structure at the edges of the sheet as compared with the middle in the direction of grain refining (increased inhibition). On the other hand, increase of the current density at 25°C. caused an insignificant structural change in the opposite sense. This is not the case with increased tempera-

Two NEW LEA® LIQUID Compositions



We now are offering a complete engineering service—layout, equipment, supplies—for liquid polishing and buffing operations.

LEA PLASTI-BRADE · · ·

a flexible liquid abrasive polishing composition carrying the finer grit sizes.

LEA PLASTI-GLUE · · ·

a flexible liquid adhesive for setting up polishing wheels.

The marked success of LEA LIQUABRADE in *liquid* buffing operations led our technical staff straight into the important field of polishing and burring with liquid compositions. First came LEABRAMENT designed for liquid polishing operations in the medium to coarse grit range.

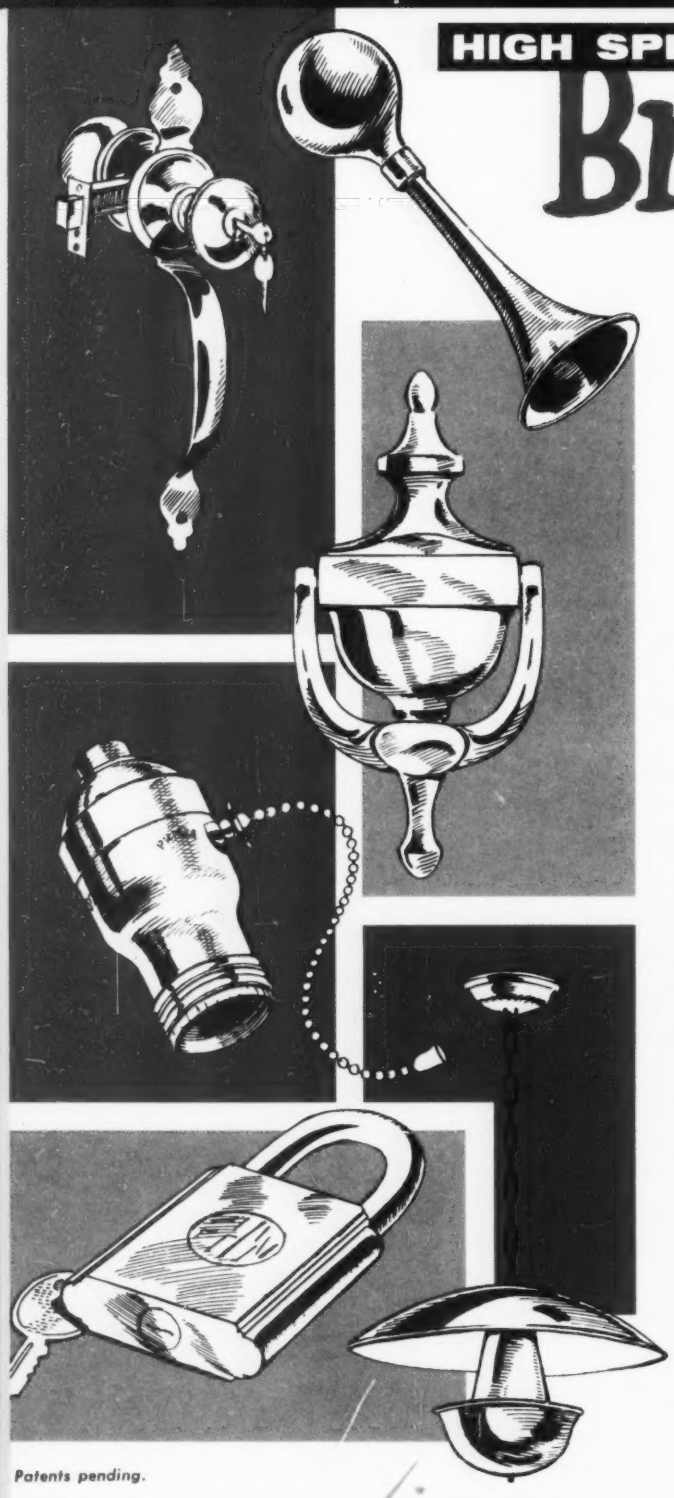
Now, we are announcing LEA PLASTI-BRADE and LEA PLASTI-GLUE, both designed for use with the finer grits for flexible polishing operations. PLASTI-BRADE is a non-flammable, stable, non-settling *liquid* polishing composition with grits ranging from 120 to 320. PLASTI-GLUE, also non-flammable and stable,is a liquid adhesive for setting up polishing wheels in the finer grit sizes. Both liquids can be sprayed, brushed or rolled. Both come in 30 to 55 gallon drums, 5 gallon pails, or gallon cans. Place a trial order today for enough to make a thorough test. If you want our recommendation as to proper grit sizes, etc., write in detail about the kind of work involved, operational steps, and end-finish desired.

Burring, Buffing, Polishing, Lapping, Plating and Spray Finishing . . . Manufacturers and Specialists in the Development of Production Methods, Equipment and Compositions. Manufacturers of Lea Compound and Learok . . . Industry's quality buffing and polishing compounds for over 30 years.

LEA®

THE LEA MANUFACTURING CO.
16 CHERRY AVE., WATERBURY 20, CONN.

Are you interested in Plating Specialties? SEE THE OTHER SIDE OF THIS INSERT.



HIGH SPEED

Brass Plating

The Lea-Ronal Brass-Glo* process provides:

- ✔ Lustrous deposits
- ✔ Simple, controllable operation

Lea-Ronal's Research Group has done it again—developed another process to help reduce your plating costs while producing better products!

Lea-Ronal High Speed Brass will produce a uniform lustrous brass color over a wide current density range (5-100 amp/sq. ft. Hull Cell). In still tank production, results show that you will obtain a cathode efficiency of 95% or over with a range of 5 to 25 amp/sq. ft. in addition to high luster. An example of the very rapid rate of deposition is that at 25 amp/sq. ft. for 5 minutes the deposit will be 0.0002" thick.

Do you want lower operating costs and increased production? This Lea-Ronal High Speed Brass Process using Brass-Glo has been providing those advantages to its users for over a year. It's well-proved. One tank will do the work of five with a conventional brass solution. With less equipment and floor space and with fewer solutions to maintain, you always will have savings. Coupled with greater production this can't help but mean better and less expensive operations and you will always get better deposits.

Patents pending.

If you are plating brass you can benefit from using Brass-Glo. Full details will be sent on request.

The
LEA GROUP
serving the Finishing Field

Lea-Ronal, Inc., Jamaica, N. Y.
Lea-Michigan, Inc., Detroit
The Lea Mfg. Co., Waterbury, Conn.
Lea Mfg. Co., of Canada, Ltd.
Lea Mfg. Co., of England, Ltd.

Plating Polishing Buffing
Burring

Lea-Ronal Inc.

Sales and Manufacturing Plant
337 East Aurora Street, Waterbury 20, Conn.
Main Office and Laboratory
139-20 109th Avenue, Jamaica 35, N. Y.

Are you interested in Buffing, Polishing and Burring Specialties? SEE OTHER SIDE OF THIS INSERT

ture. Here the current density increase acts very slightly in grain refining. The current density influence changes with the temperature, which again proves that this is the dominating influence under the applied test conditions.

Other further factors must be considered in the discussion of current density influence. Thus, the inhibitor action of atomic hydrogen certainly plays no insignificant role. Its concentration at the boundary of surface metal/electrolyte changes with the current density and also the deposition mechanism of hydrogen is dependent on the current density. Possibly also with higher current densities, there is a stronger hydrogen evoluation and an associated stirring action in the cathode film. Fischer ascribed the stirring action of the hydrogen as significant to rhythmic deposition and voltage fluctuations were observed by Meyer and Phillips, whose frequency corresponded with the number of coatings in the lamellar formed deposits deposited per unit of time.

All the deposits produced in the presence of thiourea and higher asparaginic acid concentration show a strong brilliance, independent of their crystallographic orientation. An outstanding high, mirror brilliance is only possessed, however, by the very fine-grained and particularly the lamellar coatings. Although nothing can be said as regards the causes it can be said that the grain size obviously plays a more important role than the crystallographic orientation for the formation of bright deposits.

Pickling of Aluminum and Alloys

Metalloberflaeche: Vol. 8, No. 12, p. B. 187.

The pickling of aluminum and its alloys is practiced primarily for the removal of the natural casting and rolling skin and also for the removal of the adherent impurities. The pickling process becomes of greater importance with complicated shapes and thin-walled parts. A pre-pickle treatment with organic solvents and the non-attacking alkaline cleaners is often necessary and for this purpose there can often be used a cheaper solution consisting of 10-40 g. soda and 5-10 g. sodium silicate/liter; the treatment is given at 80-95°C. for some minutes. After this pretreatment and careful rinsing the metal is pic-

stop plating-tank corrosion

with new **FLIGID®** lining

Even the most corrosive plating solutions can't harm this tank. Between the steel and a corrosive high-speed silver plating solution stands a thin sheet of remarkable new Fligid lining. Less than ⅛" thick, this laminate of two different Polyvinyl Chloride based materials offers the advantages of both, the disadvantages of neither.

The exposed face is unplasticized PVC. Inert to even the most corrosive plating mediums, it will not contaminate any plating solutions, however sensitive. The inside face is a specially compounded plasticized PVC membrane which, by a simple cement system, tightly bonds the Fligid to the vessel wall. Even the most complex plating equipment can thus be given the complete protection which *only* unplasticized PVC provides. And Fligid also permits higher operating temperatures . . . *up to 190F for some solutions.*

Chances are that amazing Fligid can permanently solve your corrosion problems. GET THE FACTS! *Write for complete information in new Bulletin "Fligid," available free on request to Kaykor Industries, Inc., 4403 Broad Street, Yardville, New Jersey, or ask your local Kaykor applicator.*

Qualified Kaykor applicators across the United States and Canada give fast, professional service applying Fligid to steel, wood, or concrete, in the field or in the shop.

KAYKOR INDUSTRIES INC.
Division of Kaye-Tex Manufacturing Corp.
YARDVILLE, NEW JERSEY

kled in 5 to 20% caustic soda at 50 to 80°C. for 1 to 2 minutes and immediately rinsed with hot flowing water. It is best to pickle for a short time with a fresh, highly concentrated bath at a higher temperature than with an old bath for a longer time at a lower temperature. It is of advantage to work in an older bath for 1-2 minutes and subsequently to process for ½ minute in a freshly prepared bath. A subsequent treatment in dilute nitric acid is necessary make certain of the removal of adherent pickling residue and surface film, which are almost invisible. This treatment is necessary when aluminum alloys are being handled, particularly copper-containing alloys. Otherwise, corrosion phenomena are almost certain to be encountered at a later date.

Clean white surfaces and a pleasing matt effect are obtained by the following baths:

1). 1 vol. conc. nitric acid.
1 vol. saturated sodium fluoride solution (or 40% hydrofluoric acid).
Treatment at room temperature for 5 minutes.

2). 3-5% sulfuric acid or
3% nitric acid
Treatment at 80°C. for 2-10 minutes.
The attack is slow and sometimes non-uniform. Nitric acid is used only with homogeneous alloys.

3). 4-8 vol. conc. nitric acid.
1 vol. hydrofluoric acid.
The treatment is at room temperature for about 5 minutes.
This bath is used for the silicon aluminum alloys, as a subsequent treatment after pickling in lye.

4). 5% sodium hydroxide.
4% sodium fluoride.
91% water.
The treatment is at 90°C. for 2-5 minutes. Subsequent treatment in 1:1 nitric acid is necessary. A particularly bright surface with a high reflective capacity is obtained.

Steel Blue Coloration on Brass

Metallwarenindustrie und Galvanotechnik: Vol. 45, No. 4, p. 182.

The simplest method of producing a blue coloration on brass parts or brass-covered components is in the bluing bath, which consists of 120 g. sodium sulfite and 40 g. lead acetate, dissolved in 1 liter of water. The solution is heated to 60°C. in an enamelled vessel and the cleaned parts are immersed.

At first iridescent films are formed from gold-yellow through violet to blue. When the blue color is attained, the parts must be taken out of the bluing bath, as otherwise the color will become light blue again and later gray. So that the coloration will spread uniformly over the surface, the parts should be moved while hanging in the bath. The color is produced quicker at higher temperatures but the desired blue tone cannot always be correctly held. A certain amount of experience is necessary in operating this coloring bath but, with the necessary experience, the process is fairly simple to conduct.

Photographic Reproduction on Aluminum

Metallwarenindustrie und Galvanotechnik. Vol. 45, No. 3, pp. 124-125.

The pretreatment before anodizing consists in cleaning the aluminum pieces which have been accurately cut to size, in an alkaline solution of:

Trisodium phosphate	15 g./l.
Sodium metasilicate	30 g./l.
Wetting agent	1 g./l.
Working temperature	80 - 90°C.

After cleaning in the above bath, the parts are rinsed in cold water and given a dip in 50% cold nitric acid, again given a cold rinse and are then ready for anodizing.

The anodizing treatment provides the aluminum with the necessary absorbent surface to take the photo-sensitive salts. Oxalic acid anodizing is used; the bath consists of a 7% solution and is worked at a temperature of 35°C. for 30-40 minutes at a voltage of 35 volts and a current density of 1.6 amp./sq. dm. Aluminum plates are used as cathode. The bath should be kept in movement during the electrolysis and cooling is necessary. After anodizing, the parts are well rinsed in running cold water for 20 minutes and the surface is then impregnated with the light-sensitive chemicals as follows:

First the anodized parts are dipped for 1-2 minutes in a solution consisting of 600 g. silver nitrate in 3 liters of distilled water and the aluminum surface is drained with a rubber squeegee. The plates are then dipped for 2-3 minutes in a solution consisting of ammonium chloride 100 g.; tartaric acid 100 g. and distilled water 3 liters. After the impregnation, the plates are dried in warm air.

The plates are then ready for light exposure. The lighting exposure time will depend upon the negative used and the light intensity. With normal daylight the exposure can be 3 minutes.

Fixing and developing of the photographic image on the plates is the next stage. Contrary to normal photographic practice, one first fixes and then developes. Fixing is conducted for 3 minutes in the normal thiosulfate solution and the development is then given to requirements. The developer used is: citric acid 17 g.; metol 4 g.; hydroquinone 6 g.; distilled water 1 liter. The second solution is silver nitrate 32 g.; citric acid 8 g.; conc. nitric acid 12 cc.; acetic acid 18 cc.; water 160 cc. Ten parts of the first solution are mixed with 1 part of the second solution before use. The picture obtained can then be toned in gold chloride solution. The photograph, after development, is sealed for 15 minutes in boiling distilled water.

Electropolishing of High Speed Steel Tools

Prace Instytutow Machaniki (Poland). Vol. 7, pp. 32-53.

The article covers development work conducted in the Soviet Union. It was established that high speed steels can be electropolished and, after a previous lapping, the cutting edge angle can also be electrolytically removed. The tests which were conducted were confined to the steels SW9 and SW18 and it was established that the cutting life of the tool is about 20% higher if electropolishing is installed as part of the tool processing. For electropolishing tests, an electrically heated cell was installed which was coupled to a current source of 5-10 volts through a regulator. The opposing cathode had a cylindrical form. The electropolishing electrolyte had the following composition:

1.6	Orthophosphoric acid	65%
1.84	Sulfuric acid	25%
	Water	10%

The results are presented in the

form of numerous curves and diagrams, indicating the data obtained under the most varied working conditions.

Removing Copper Deposits from Brass Racks

Metallwarenindustrie und Galvanotechnik, vol. 45, No. 12, p. 606.

A practical way of chemically removing copper deposits from brass without attacking the brass is as follows. About 200 g. of sodium sulfide and about 15 g. of flowers of sulfur are dissolved in one L. of water. Also, a 10% sodium cyanide solution is used. The brass objects to be stripped are dipped for 5 minutes in the first solution at room temperature, by which the copper is oxidized to copper sulfide. The parts are then dipped in water. The loose copper sulfide can then be scratch-brushed off. The parts are then dipped in the cyanide solution, which dissolves the sulfide. The process can be repeated until all the copper has been removed down to the clean brass surface. The number of times the cleaning process has to be repeated will depend upon the thickness of the copper coating on the brass.

It does not help to leave the part in the sulfide bath for a prolonged time. It is necessary to repeatedly remove the copper sulfide coating. Although the brass is not normally attacked by these solutions, it is not advisable to leave the parts in the sulfide solution too long as, in the course of time, even the brass would ultimately be attacked by the sulfide.

Engineering Aspects of Electropolishing of Steel

Bulletin Technique: (Belgium) No. 21, 1954, pp. 24-25.

If the modes of action of electropolishing and mechanical surface working are studied, it will be confirmed that these two processes are essentially different. Mechanical polishing operates by viscous metal removal with levelling of the surface peaks and covering of the depressions. The process causes a modification of the surface with the formation of a new metal surface layer, the Beilby layer, which may be regarded as the welded together debris of the disintegrated metal crystals. This microcrystalline layer comprises, in addition, chemical and physico-chemical modifications as regards the subjacent metal. These modifications are due to the material used for the mechanical polishing and to the high temperatures attained during the operation. The surface layers of a metal ground and polished mechanically are, accordingly, different from the constitution of the metal body. The general tempo of mechanical polishing is a flow process. Electropolishing, on the other hand, operates by selective solution of the surface peaks and a general levelling results which is all the more perfect the more homogeneous the metal which is being treated. The ideal case is where the metal will dissolve in the electropolishing bath at the same speed at all points after the surface peaks have disappeared. The structure of the metal here is, accordingly, of fundamental technical importance. Where structural inhomogeneities of the metal are present, these will become evident during the course of electropolishing.

Factors governing the suitability of the application of the electropolishing of steel will be: the initial state of the metal surface; the "quality" of the metal; the size and shape of the metal part; the volume of production; the opinion of the customer as regards the final aspect.

From the engineering aspect, the geometric results are generally excellent when special "super-finish" electropolishing baths are used. The surface characteristics such as fatigue are generally satisfactory after electropolishing. If special surface treatment is desired, such as surface hardening by shot-peening, this can be given after the electropolishing. The frictional and wear resistance characteristics of an electropolished steel surface are excellent. Tests have shown at times a considerable reduction of the coefficient of friction of the electropolished surface and an important reduction of wear. The resistance to corrosion of an electropolished surface is outstanding. A particularly interesting application of electropolishing is in the case of hard chromium in which it is of great advantage to apply a prior electropolish. Electropolishing serves to remove the surface coatings which have been disturbed by the mechanical machining operations and this permits the hard chromium to be deposited under favorable conditions and both the adhesion and the nature of the deposit are improved at the same time.

Brightening and Polishing Processes for Aluminum

Aluminium (Germany). Vol. 29, No. 11, pp. 451-461.

The new chemical and electrolytic polishing processes for aluminum can only be carried out with satisfactory results if the material being treated has a sufficient degree of purity. A suitable metal for polishing is Reflektal which 99.99% pure. The treatments discussed are mechanical polishing, degreasing, brightening by electrolytic or chemical polishing processes.

The Erftwerk chemical brightening process is considered in detail. With this process a pickling loss of 50 to 100 g./sq. meter is to be expected. The bath consists of:

Ammonium bifluoride	10-20%
Nitric acid	10-15%
Water	Balance
Bath temperature	50° to 80°C.
Immersion time	5-30 seconds or longer

A clear bath is used for brightening of a polished surface, which is as follows:

Phosphoric acid, 1.7	35 cc./l.
Chromic acid	20 g./l.
Bath temperature	90-95°C.
Immersion time	5 minutes

Effect of Oxide Compactness on Determination of Thickness of Anodized Coatings by Gravimetric Methods

Aluminio (Italy). Vol. 12, No. 2, pp. 148-151.

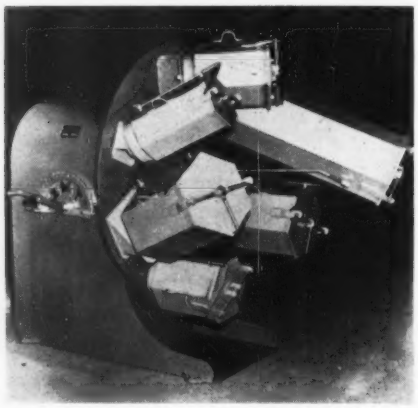
In order to establish gravimetrically the influence of the oxide compactness on the determination of the thickness of anodized coatings, a series of measurements of various thicknesses were undertaken. The compactness of the coating was ascertained directly by a hydrostatic balance and indirectly by A.S.T.M. B 137/45 weight values, also by measurements of the thickness with the Abbe thickness tester. It was found that with the same oxidation conditions, the various values agreed well with one another and with the calculation of d=2.5.

Recent Developments

NEW METHODS, MATERIALS AND EQUIPMENT
FOR THE METAL FINISHING INDUSTRIES

Multi-Barrel Machine

BMT Mfg. Corp., Dept. MF, 110-112 E. 9th St., Elmira, N. Y.



Illustrated is the latest model Multi-Barrel Slide-Honing machine, a modern precision tumbling unit with controlled-motion honing that does not affect dimensional tolerances of parts, yet is claimed to remove burrs, flash, tool marks, rust, paint, plating, and heat treating scale, and to contribute to finer micro-finish and color of metal. In addition rounding corners, cleaning fillets, and blending chamfers can also be done successfully on a variety of work pieces at the same time and on the same machines without mixing, either wet or dry. Up to 25 barrels can be mounted on the unit with a range of mountings, barrel sizes, linings, and shapes.

The unit has dependable power chaindrive with variable speeds of 11 to 28 r.p.m. The machine itself requires a space of only 4 ft. x 4 ft.

Motion Picture on Metals Finishing

Bart-Messing Corp., Dept. MF, 229 Main St., Belleville, N. J.

A new educational motion picture with sound deals primarily with the electroplating facet of metals products finishing. Entitled "A Brighter Tomorrow" this 16mm technicolor film which runs approximately 30 minutes, visits the various plants of the above firm where a number of interesting metals finishing processes and applications are observed and described.

The manufacture of rectifiers and filters for the electroplating industry is followed from the drawing board to the finished product. Scenes taken in the laboratories of Sel-Rex Precious Metals, Inc., an affiliated company, show some of the meticulous procedures employed in the preparation of precious metals salts and solutions.

The film gives a panoramic view of the industry's contribution to our country's security, welfare and comfort; from the anti-corrosive electrodeposits of nickel on airplane propellers, steel sheets and pipes and fittings, to the functional or decorative electroplating of gold, rhodium and silver on electrical or electronic components, jewelery and various household articles.

A print is available free of charge to qualified organizations for showing at sales meetings, conventions, educational seminars, or any public gathering interested in the vital electroplating subdivision of the metals finishing industry.

Bright Cadmium Plating Process

Hanson-Van Winkle-Munning Co., Dept. MF, Church St., Matawan, N. J.

A new Cadalume process for bright cadmium plating in still tanks introduces a simple to operate, low-cost bath for producing bright, uniform, eye-appealing cadmium deposits. The process makes bright dips unnecessary, although it will take conversion coatings, according to the manufacturer. The brightener may be added directly to the bath. No break-in period is needed; the desired deposit brightness appears immediately in a balanced bath.

Although the deposit has exceptional brightness as deposited, on deeply recessed work, a 1% nitric acid bright dip may be used to brighten low current density areas.

The cost of the process is low, as is the rate of consumption, since a single liquid brightener is used in a standard cadmium solution. This new process is claimed to increase plating speeds, improve deposit distribution and throwing power, and produce heavy deposits, where required, without loss of brilliance or formation of surface defects.

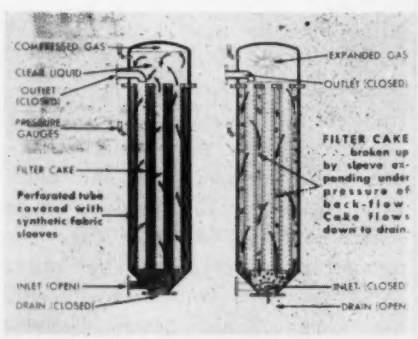
Most conventional cadmium solutions, or a bright cadmium bath, can be converted to the new process by simply adjusting the solution to the required formula, then adding the required amount of addition agent. However, a sample solution should be sent to the company's laboratory, for conversion recommendations.

Self-Cleaning Filter

Industrial Filter and Pump Mfg. Co., Dept. MF, 5906 Ogden Ave., Chicago 50, Ill.

Hydra-Shoc is a tubular filter useful for any water or chemical purification task. It builds up air pressure at the end of the filtering cycle and uses the pressure for a sudden backsurge to clean the filter. No extra devices are used, the filter shell itself acts as the pressure chamber and the arrangement of regular valving provides the controls. The device eliminates the use of filtered water for cleaning and the need for back flow pumps. Operating vertically, it takes very little floor space. This design provides highly efficient, convenient filtration at a relatively low price.

The filter follows the usual opera-



w, as
nce a
in a
s new
lating
ution
oduce
with-
on of

solu-
, can
ss by
he re-
e re-
agent.
ld be
, for

Mfg.
Ave.,

use-
urifi-
ssure
and
back-
a de-
itself
d the
pro-
elimi-
for
flow
takes
pro-
t fil-

pera-

H-VW-M *Generators not only meet standards -they make 'em!*

Yes, today's performance standards are higher than ever for motor generator sets. And the final examinations that *all* H-VW-M low voltage motor generators must pass before delivery have consistently raised industry standards for voltage regulation, power factor correction, overload capacity, and exceptionally long and efficient life for all parts. It's a painstaking, exacting process, but the net result is a line of generators that can't be beat.

Manufacturing top-quality generators is only one of many results of over eighty years of constant electroplating development – a continuing policy summed up in H-VW-M Platemanship...your working guarantee of the best that industry has to offer—not only in plating—current generators—but in every phase of plating and polishing.

8541

PLATEMANSHIP

PLATEMANSHIP PLATING & POLISHING PROCESSES • EQUIPMENT • SUPPLIES

For full information on all H-VW-M Low-Voltage Generators, ask for Bulletin G-102.

HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY, U.S.A.

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

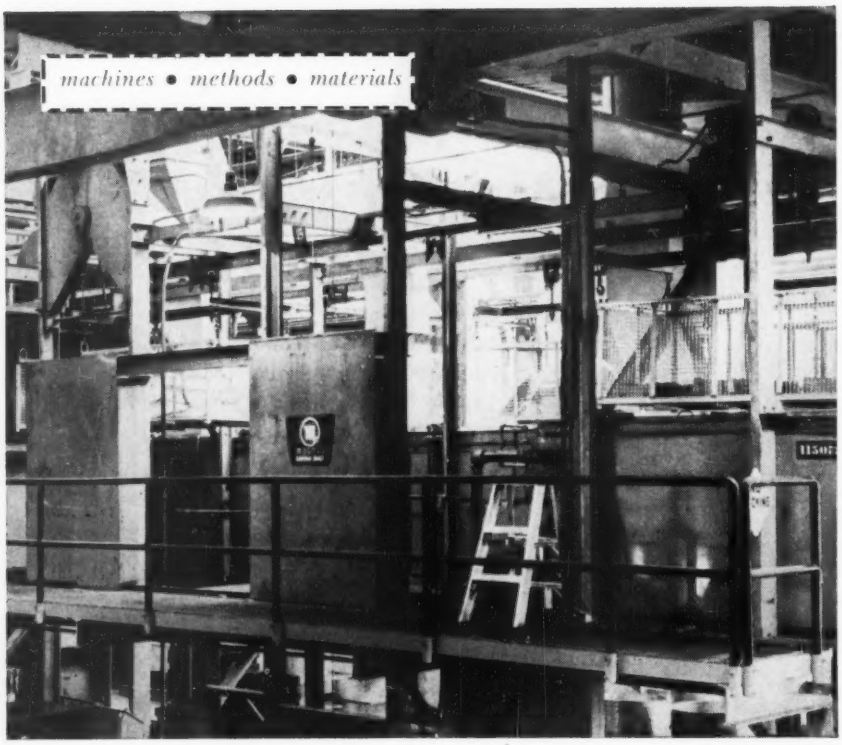
HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.

Plants: Matawan, N. J. • Grand Rapids, Mich.

SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston Bridgeport • Chicago • Cleveland • Dayton • Detroit • Grand Rapids • Los Angeles • Louisville • Matawan • Milwaukee New York • Philadelphia • Pittsburgh • Plainfield • Rochester St. Louis • San Francisco • Springfield (Mass.) • Utica Wallingford (Conn.)

H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

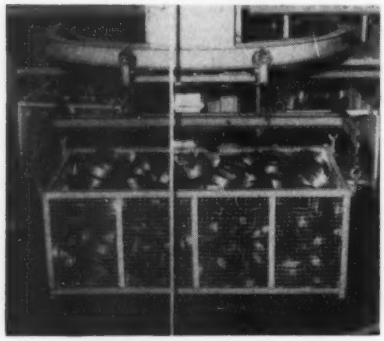


Cleans 3 Times More Parts with 80% Less Manpower

The problem facing one of the largest aircraft engine manufacturers was how to remove chlorinated oils and shop dirt from special alloy metal parts. They were using 3 degreasing machines operating 3 shifts per day. 18 men per day were required on the cleaning operation. Each of the machines consumed 1000 gallons of solvent per month.

Cleaning was not only falling behind production, but material and labor costs were prohibitive.

Solution: The installation of a specially designed Magnus Aja-Lif Automatic Machine using a low-cost Magnus cleaner completely solved the problem. 3 times more work is produced with only 3 men per day (1 per shift) . . . a labor saving of 80%. Through the labor and material savings obtained, the Magnus machine paid for itself in 18 months.



For information on the full line of cleaning machines, materials and methods, write to Magnus Chemical Company, Inc., 11 South Avenue, Garwood, N. J. for Bulletin 10,000-G.

magnus

Industrial Cleaning Division

MAGNUS CHEMICAL CO., INC.

—a world-wide organization specializing in cleaning and protection of all surfaces.

tion pattern for tubular filters. The influent passes through the walls of perforated tubes covered with synthetic fabrics. Pre-coating, when needed, is done in the usual way.

The cleaning procedure is extremely simple. The outlet valve is closed, building up pressure on the entrapped air, then a pair of quick opening valves simultaneously shut off the inlet and open the drain. The compressed air instantly causes a violent back-surge that expands the tube covers, dislodges the filter cake and forces it out the drain in a matter of seconds.

The new filters are built to ASME Construction Code in a wide range of materials with lined or unlined chambers.

Chromium Plating Rack for Crankshafts

Wells Process, Inc., Dept. MF, 3041 Perkins Ave., Cleveland 14, O.

The above firm has been established for the manufacture and sale of a new holding fixture for crankshafts, and to license its use in selected areas of the country. The patented fixture continuously rotates the crankshaft in a vertical position in the bath and, at the same time, maintains the anodes at a fixed distance from the rotating journal surfaces to insure an even distribution of the chromium deposit.

The fixture was invented by Harold R. Wells, president of Chrome Engineering Co., Inc., Cleveland.

Sprayable Plastisols

Stanley Chemical Co., Dept. MF, East Berlin, Conn.

Two types of spraying plastisols can be sprayed on cold metal in a vertical position without sagging when applied over the manufacturer's plastisol primer #40X-415.

Both types are true plastisols and contain no volatile ingredients. The manufacturers says that these plastisols have extremely high gloss when applied according to their directions and can be sprayed at 100 per cent solids.

Type 1 is recommended for film thicknesses of from 10 to 15 mils, and

is available in a range of colors for decorative finishes.

Type 2 is available in black and is recommended for film thicknesses of from 50 to 60 mils without heating between coats. This type is designed for lining chemical storage tanks, tank cars and comparable equipment.

Polishing Belt Lubricant

Kocour Co., Dept. MF, 4800 S. St. Louis Ave., Chicago 32 Ill.

Kocour Belt Grease was developed as a polishing aid for abrasive belt operation on both ferrous and nonferrous metals. This perfectly uniform compound is chemically controlled to insure good results. Its non-loading properties maintain a film on the abrasive surface thus preventing metal particles which normally adhere to cutting points from loading up the abrasive surface. This action minimizes dulling of abrasive grain on the belt, thus maintaining a sharper cutting surface throughout the entire life of the belt. Belt life is usually increased in terms of more production units per belt. The grease will not clog the belt and operation and maintenance is much cleaner, eliminating the necessity of stopping production to wash abrasive belts.

The new belt grease is available in paper tubes, 2½" x 8½", each weighing approximately 1¼ lbs., and can be supplied in any quantity required. Free samples are available from the manufacturer.

Chromate Conversion Coating

Conversion Chem. Corp., Dept. MF, Rockville, Conn.

Kenvert 40 is especially designed to

HERE'S A TIP ON
CHROMIUM PLATING

INSTALL POWERS
Automatic
Temperature
Control
For All Metal
Finishing Processes

For plating tanks and other metal finishing processes. Powers Controls quickly pay back their cost by accurately holding solutions at a constant uniform temperature.

POWERS CONTROL

POWERS 3

TECHNICAL DATA SHEET
CHROMIUM

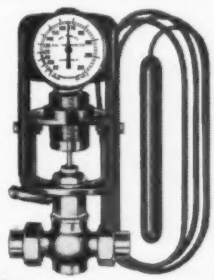
IF you plate—CHROMIUM

***Too high a temperature* can result in:**

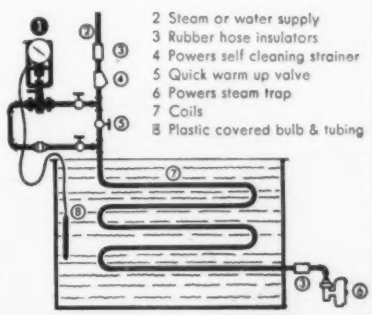
1. Burnt deposits
2. Frosty deposits
3. A decrease in cathode efficiency
4. A loss in throwing power
5. A soft deposit

***Too low a temperature* can result in:**

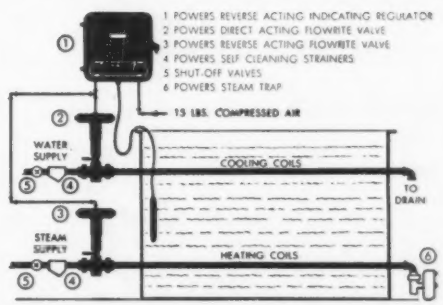
1. A slow rate of plating
2. Milky deposits
3. A decrease in tensile strength
4. A decrease in deposit density
5. Cracked deposits
6. Dark deposits



1 POWERS No. 11MF Self-Operating TEMPERATURE INDICATING REGULATOR


2 Steam or water supply
3 Rubber hose insulators
4 Powers self cleaning strainer
5 Quick warm up valve
6 Powers steam trap
7 Coils
8 Plastic covered bulb & tubing

COMPRESSED AIR OPERATED CONTROLS FOR PRECISE CONTROL OF HEATING and COOLING



In plating tanks, washers, heat exchangers, degreasers, Powers Temperature Controls more than pay for themselves. They save by stopping costly *over* or *under* heating.

Regardless of the size of your plating operation, there's a Powers Temperature Control precisely suited to your needs.

(c27)

THE POWERS REGULATOR COMPANY
SKOKIE, ILLINOIS • OFFICES IN CHIEF CITIES IN U.S.A. AND CANADA • SEE YOUR PHONE BOOK

THE POWERS REGULATOR COMPANY, 3400 Oakton Street, Skokie, Illinois

☐ Please send Bulletin 330 and Prices on Powers No. 11-MF Temperature Regulator for_____
(Print name of process or type of plating)

☐ Send Bulletin and Prices on Temperature Control for: ☐ Heat Exchangers ☐ Washers ☐ Degreasers

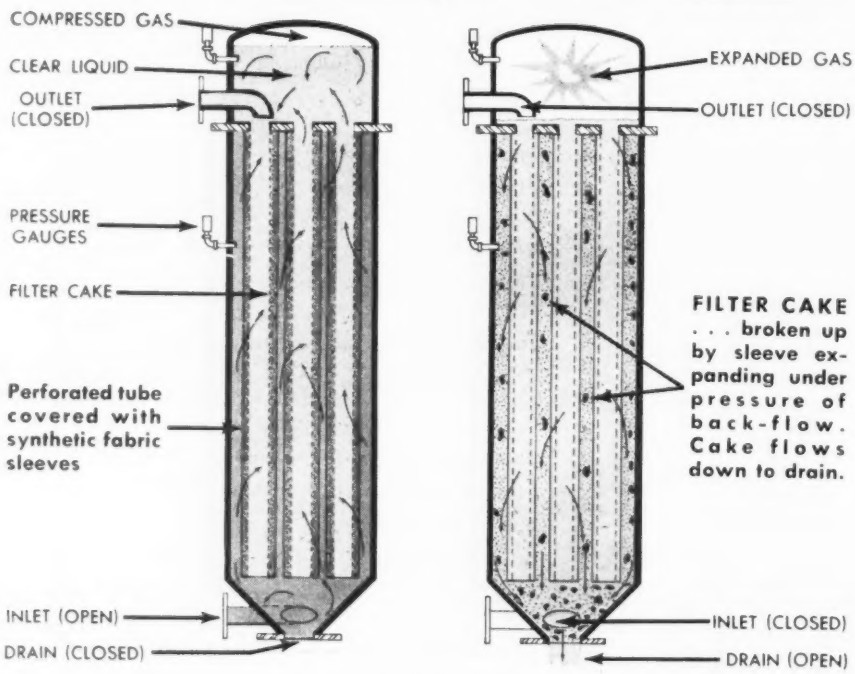
Name_____ Title_____

Company_____

Address_____

NEW! Hydra-Shoc* SELF-CLEANING FILTER

*Trade Mark



Industrial's new tubular filter creates own air pressure for fast self-cleaning in seconds...

- **SMALL FLOOR SPACE**
- **ELIMINATES FILTERED WATER FOR CLEANING**
- **ELIMINATES BACK FLOW PUMPS**

Simply shutting off the outlet valve at the end of a filtering cycle prepares the filter for Hydra-Shoc cleaning. The air trapped in the filter chamber builds up under normal input pressure. Then a set of quick opening valves simultaneously shut off the inlet and open the drain. The air, suddenly released with a hammer-like blow, expands the fabric sleeves, instantly dislodging, and forcing the filter cake through the drain in seconds.

Special bulletin now available showing operating sequence, sectional drawings and principle of operation.

SEND NOW FOR YOUR COPY OF BULLETIN NO. 114-1155.

CENTRIFUGAL PUMPS · PRESSURE FILTERS · ION AND HEAT EXCHANGERS · RUBBER LININGS · WASTE TREATING EQUIPMENT

Industrial

INDUSTRIAL FILTER & PUMP MFG. CO.

5906 OGDEN AVENUE • CHICAGO 50, ILLINOIS

prevent the oxidation of aluminum when that metal is used in place of copper for electrical purposes in sheltered areas. The material is claimed to seal the aluminum with a film having a very low microhm resistance.

The process is extremely simple to use, and the work may be treated in batch processes, or continuously by dip or spray. Treatment time varies depending upon the degree of protection desired.

All-Purpose Floor Absorbent

The Diversey Corp., Absorbents Dept. MF, 1820 Roscoe St., Chicago 13, Ill.

A new industrial floor absorbent is said to soak up more than it's own weight in oil, greases and other fluids. Called Pickup, this all-purpose absorbent's low density per cubic foot provides greater floor coverage per bag. It assures absorption of oil, greases, water and acids and provides a dry, non-slip floor surface to reduce personal injuries and fire hazards caused by oily, slippery floors.

The manufacturer reports that the product has been approved by the Underwriter's Laboratory and is safe for use on industrial floor surfaces. Being chemically neutral, it will not injure personnel or equipment.

The material is said to be dust-free for pleasant handling and application. It is unaffected by heat or cold, and can be stored for long periods without caking or deterioration.

Pre-Enameling Process for Aluminum

Aluminum Co. of America, Dept. MF, 1501 Alcoa Bldg., Pittsburgh 19, Pa.

Known as the Alcoa R-100 process, this patented chemical treatment for aluminum is simple, inexpensive and well suited to a continuous enameling operation. The new conditioning treatment will eliminate multiple chemical baths and the prefiring operation, formerly necessary to insure controlled surface conditions.

When applied to aluminum, the process will produce a uniform, conditioned surface in one step. The metal will then readily accept a porcelain coating. The process has passed all known laboratory tests and substantial savings in manufacturing costs are anticipated from its use.

Voltage Sensing Rectifiers

Rapid Electric Co., Dept. MF, 2881 Middletown Road, New York 61, N. Y.

The above manufacturer has developed "voltage sensing," in conjunction with their selenium and germanium rectifiers. These rectifier units automatically increase the output voltage as the load or current demand is increased. Developed for automatic plating operation, its use can be extended to other electrolytic applications where a greater degree of constant current density is required.

The amount of voltage increase with increasing load may be varied by a simple control which is preset. In automatic program plating, during a fully automatic plating cycle, and as succeeding racks are added to the solution, (increasing load) the voltage requirement increases in order to maintain a required current density in all the work. At the end of a plating period the voltage automatically decreases to prevent excessive current density or burning of the remaining pieces of work. Constant current control through voltage sensing will offer immediate economic results in view of elimination of human error, decrease in required labor, improvement of plating quality and radical reduction of spoiled work, it is claimed.

Stain Preventive for Zinc

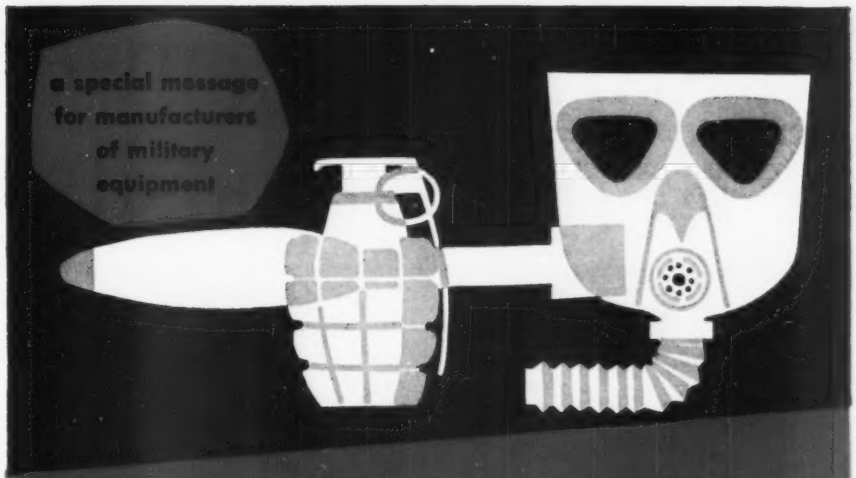
The Chemical Corporation, Dept. MF, Springfield, Mass.

Luster-On Stain Preventive is designed for the large volume producer of zinc plating. It is claimed to be a very economical finish to maintain uniform long shelf life. Suggested uses are on electrical conduits, outlet boxes, plated sheet stock and wires screening.

Coated Work Gloves

Surety Rubber Co., Dept. MF, Carrollton, O.

A new coating compound claimed to be practically indestructible in the presence of petones, acetones and petroleum base degreasing solvents has been trade-named Solvaseal, and is now being applied to fabric work gloves which are sold under that name. The gloves themselves are of special design incorporating curved fingers for hand comfort and wing-thumb construction which eliminates pulling



need a finish to beat these specs?

specify IRIDITE

AN-C-170 MIL-S5002 MIL-C-5541 AN-P32
AMS-2402A USA-50-80-11A J.Q.D. No. 144B
USA 57-93-2A O.S. No. 1374 USA 57-0-2C AN-P61
A-XS-1607 QQ-P-416 QQ-Z-325 MIL-3151—
if you're finishing under these or similar specifications, here's how you can use Iridite:

ON ZINC AND CADMIUM you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.

ON COPPER . . . Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.

ON ALUMINUM Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.

ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

Testing For Causes of Rough Deposits?

9. Run a plating
By using a testing procedure it
determine chemical adjustment, addition agent
and bath treatment necessary to return the bath to nor-
mal plating. Such testing may also indicate the need
for greater filtering capacity or for continuous filter-
ing. If filtering is required on a laboratory scale to ob-
tain satisfactory test results then filtering is required
to obtain quality production plating.

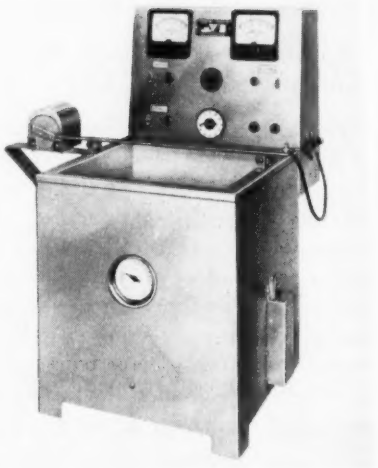
Filtering Methods

method for filtering plating baths with a

SEND FOR THIS SPECIAL METAL FINISHING REPRINT

This article — "The Use of Filters in Electroplating" — by Mr. J. B. Mohler, Metal Finishing consultant; especially reprinted from the Metal Finishing Magazine is available to you for the asking. For your free complimentary copy write Alsop Engineering Corp., 1103 Bright Street, Milldale, Connecticut.

ALSOP ENGINEERING CORPORATION *Positive Filtration* *FIRST STEP IN CUTTING COSTS*



large meters and timer to insure accurate plating.

The double wall tank unit is heated with sealed contact heaters that are thermostatically controlled. A cathode rod agitator is incorporated for uniform heavy deposits on industrial parts. This unit was designed to meet the increasing demand for gold plating of printed circuits and other industrial components.

Phosphate Conversion Coating

Metasurf Corp., Dept. MF, 12830 Eaton Ave., Detroit 27, Mich.

A new and highly efficient phosphating material, known as "Metacote" is stated to be adaptable to both spray washer and immersion tank processes and create a fine, even, tightly adherent coating which assures exceptionally good paint adhesion and salt spray resistance. It is a non-sludging type material and may be used in mild steel equipment. Although it is normally used for treating steel, it is also effective on aluminum and zinc die cast metals. An outstanding characteristic claimed for the material is that no special additive or secondary material is required in order to produce consistently good results. Concentrations of the solutions are controlled through a simple titration and for which a test kit is furnished.

Wet Type Dust-Fume Collectors

Zack Company, Dept. MF, 4600 W. 12th Place, Chicago 50, Ill.

The new dust-fume collector units are reported to involve a unique, highly original cone and baffle design which is said to result in a "cyclonic" washing action. This, in turn, creates a turbulence which separates the wet

loose at the seam between the thumb and palm.

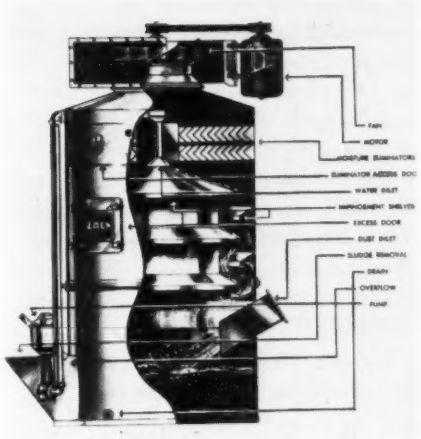
Service given by the new coating is said to be phenomenal, many users reporting wearing life far in excess of gloves formerly used. However, they are specifically not for use in steam, water or alkali degreasing products.

The coated fabric work gloves are manufactured in women's 11 inch gauntlet style and men's 12 inch and 14 inch gauntlet style. The coating is an attractive cherry red.

Self-Contained Plating Unit

Ramyr Mfg. Co., Dept. MF, 1624 East 1st St., Los Angeles 33, Calif.

A new complete self-contained unit includes DC power supply and double wall stainless steel tank. The power supply has stepless voltage control,



dust and carries it to a sludge tank for removal. Water, supplied by a direct driven pump, cascades downward within the collector. This action results in a series of closely related water curtains through which the dust and fume laden air is filtered in its upward travel. The dust and fume laden air is in continuous fluid contact during the upward flow. A double row of moisture eliminators, fabricated in convenient handling size, are mounted above the washing chamber. Access doors are provided in the housing for the inspection of eliminators and wash chamber.

The collectors incorporate flat bottoms in their design. These serve as settling tanks from which the water is recirculated. A chute type of cleanout is provided for simple hand cleaning of the settling tank. These wet type dust-fume collectors are also produced with flight conveyors for automatic ejection of sludge from tanks to containers.

The collectors are built in the following models: Floor type, hand cleanout complete with built-in fan in small sizes, or separate fan mounted vertically above collector in larger units: Floor type with sludge conveyor for larger sized units operating on heavy dust loads; Floor type units for overhead mounting to meet existing conditions; Cone type bottom units for overhead or truss mounting; Systems involving one or more cone type units assembled to discharge into one settling tank. The collectors are available in sizes and capacities from 500 C.F.M. to 40,000 C.F.M.

Corrosion-Proof Coating

Rubba, Inc., Dept. MF, 1015 E. 173rd St., New York 60, N. Y.

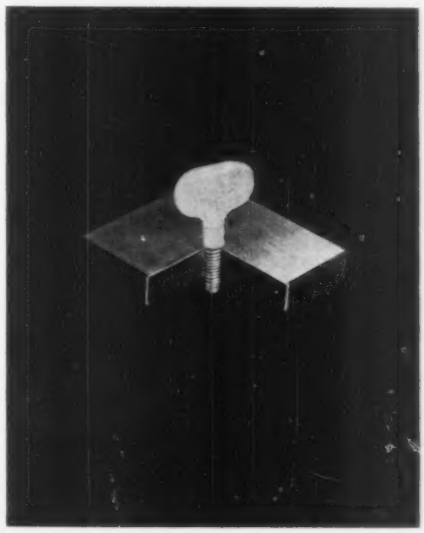
Rubbakote, a new liquid rubber coating which prevents corrosion in electroplating tanks, is claimed to be self-vulcanizing, require no mixing, and adhere tenaciously to all types of metal.

It dries within 30 minutes after application, is not affected by acid or alkali, and can easily be applied by brush or spray.

Plastic Plugs

Plastic Molded Parts, Inc., Dept. MF, 1220 Fifth Ave., E. McKeesport, Pa.

The problem of redrilling and retapping holes after spraying, dipping, plating or anodizing, can now be eliminated through use of a polyethylene



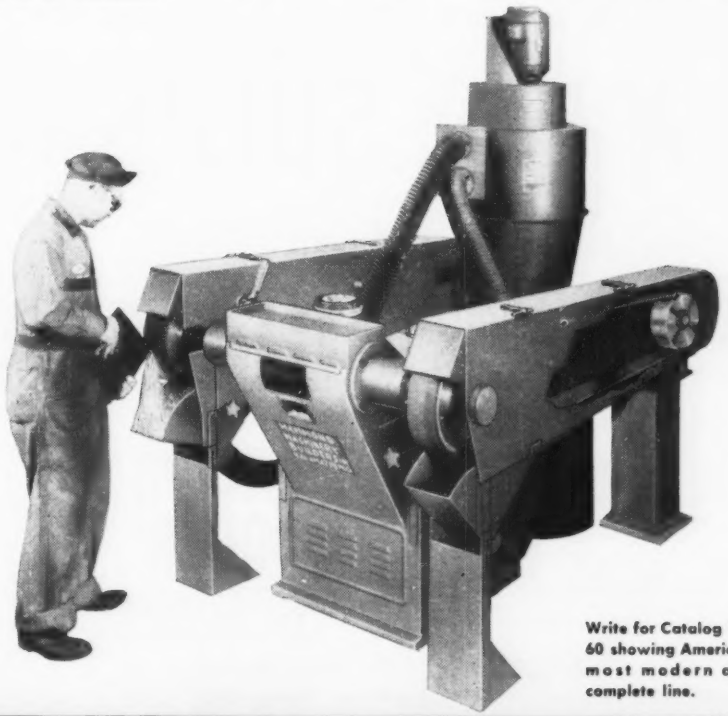
Hammond OF KALAMAZOO
GOOD MACHINERY SINCE '82

MODERN Self Contained GRINDER-POLISHER

Hammond Variable Speed (1500 to 3000 RPM) Polishing and Buffing Lathe. Models up to 50 HP available.

Hammond Cyclone Duskolector. One of a wide line of Cyclone and Filter Types.

Hammond Backstands. 10 Air and Spring Tension Models to choose from.



Write for Catalog No. 60 showing America's most modern and complete line.

Hammond Machinery Builders INC.
1601 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN
SEE US AT BOOTH 675 ASTE SHOW, MARCH 19-23, CHICAGO

PHELPS DODGE REFINING CORP.

Serves the Plating Industry with:

TRIANGLE BRAND

COPPER SULPHATE

TRIANGLE BRAND

NICKEL SULPHATE

PHELPS DODGE REFINING CORP.

300 Park Avenue, New York 22, N. Y.

5310 West 66th Street, Chicago 38, Ill.

plug called Poly-Plug. The plugs are pressed or screwed into the holes of the parts to be processed. after which they are pulled from the holes leaving them clean and ready for assembly. Plugs can be used over again as many as 20 times.

Standard sizes are available for all tap sizes from No. 1 to ½". Plugs can be made in any other plastic required for special conditions. Prices average about $4 per hundred. Literature and samples are available upon request to the above manufacturer.

Compounds for Finishing Aluminum

Hanson-Van Winkle-Munning Co Dept. MF, Church St., Matawan, N. J.

Specific compounds that counteract aluminum's tendency to drag under buffing are now offered to the industry as a result of the above manufacturer's research.

Two liquid compounds, Liquid Tripoli 303 and 420, have proven most effective in heavy duty cutting applications, the company reports. These are now used extensively in the aluminum pot and pan industry.

The new Liquid Tripoli 728 provides excellent cut, while leaving the surface with a high clean color. This compound is particularly applicable to the appliance, storm window and automotive fields.

Several tripoli bar compounds meet specific requirements for cutting down aluminum, the company reports. These range from very greasy compounds for heavy duty operations to medium greasy for general purposes. For cut and color, a number of white compounds are available. Where high color is a requisite, the manufacturer recommends several of its newly-developed aluminum oxide compounds, No. 6B-168, 6B-72 and 8390. Lime-type compounds are also available for this type of work.

Bright Bronze Plating Process

Battelle Development Corp., Dept. MF, 505 King Ave., Columbus 1, O.

A new bright bronze decorative plate of about 90 per cent copper and 10 per cent tin is called Bright Lustralite 10, to distinguish it from regular Lustralite 10, which is not so bright and is used in engineering applications. It can be used instead of copper and/or bright-nickel plate to protect steel and zinc die castings from corrosion. The bright bronze deposit is plated directly with chromium, by using the conventional bath for chromium plating, or is directly plated with bright nickel and chromium without the necessity for buffing.

The plate is mirrorlike according to claims. For color plating the true red-bronze appearance can be preserved by lacquering A bright golden color variation can be produced by changing the formula to 85 per cent copper and 15 per cent tin.

The bright bath, like the regular baths, has excellent throwing power, making it especially useful for uniform plating of complex-shaped parts. Leveling power is exceptional with rough surfaces smoothed as much as 60 per cent by plating only 0.0007 inch of bright bronze.

The plate is uniform in brightness over a wide current-density range. The plating salts and brightener are stable. Control is similar to that of a bright-copper bath. Cathode efficiency is between 50-70 per cent; anode efficiency between 70 and 90 per cent. Thus, the anodes not only supply the metal plated on the cathodes but also replace the metal ordinarily consumed by dragout.

Corrosion Resistant Pipe Dope

Eco Engineering Co., Dept. MF, 12 New York Ave., Newark 1, N. J.

A Teflon based pipe dope is claimed to have given excellent performance in threaded pipe and fitting assemblies with corrosive and difficult-to-hold li-

quids and to have unusual powers in minimizing seizure or galling.

The use of T-Film permits the economical reuse of expensive alloy valves and fittings, as well as the use of threaded components in lieu of costlier flanged, gasketed or welded assemblies. Similar advantages are noted for use in assemblies of dissimilar metals. In addition to its anti-seize qualities, the material acts as a protective barrier, minimizing the possibilities of galvanic corrosion.

The product is available in 2 and 4 oz. jars at $2.00 and $4.00 per jar, f.o.b. Newark, N. J. To determine suitability of the dope for unusual applications, company engineers request data on materials of construction, temperatures, fluids being handled and dimensions of threaded units.

1-5 H.P. Motor Line

Small Integral Motor Dept., General Electric Co., Dept. MF, Fort Wayne, Ind.

Two new lines of enclosed, non-ventilated, fan-cooled A C motors are designated as "Standard Enclosed" and "Severe Duty Enclosed." They will replace a single line of one-through-five horsepower motors.

The "Standard Enclosed" motor features a steel conduit box and fan cover. The conduit box has "keyhole" mounting for quick and easy installation. Mounting screws need not be removed. A half-inch conduit hole with a three-quarter inch knockout is provided for versatility. The conduit box is completely gasketed with cork neoprene.

The fan cover, also of steel, is lighter, more rugged and easier to realign on reassembly. Cast iron, for rigidity, is retained on the rest of the enclosure.

Both new lines feature longer perma-numbered leads for use with time-saving wire nuts. Every enclosed, foot-mounted motor is now equipped with a lifting eye.

The "Severe Duty" line is basically the same as the standard line, except for certain features which make it suitable for use in corrosive or excessively moist atmospheres. As an example, all threaded parts are coated with a special lubrication to prevent threads from seizing even after five years of operation. Neoprene-sealed washers on the through bolts and a new type shaft seal give additional moisture protection. The conduit box and fan cover are of cast iron for greater corrosion resistance. A stainless steel hardware kit is available for the most severe chemical conditions.

Better clean up first!

No use trying to cover up poor cleaning with decorative plating. Get rid of blisters and blemishes *before* they show up.

Cowles FE ELECTRO CLEANER

gets *all* of the soil because it *gets to* all of the soil. No crevice or corner escapes its soil-penetrating power.

GET THE FULL STORY ON HOW Cowles FE ELECTRO CLEANER penetrates soil (rapid wetting) dislodges soil (high current capacity) disperses soil (through emulsifying)

Ask your Cowles Technical Man—or send this coupon for Technical Bulletin about Cowles FE Electro Cleaner.

COWLES CHEMICAL COMPANY
7014 Euclid Avenue
Cleveland 3, Ohio
Please send Cowles FE Bulletin
Name_____
Company_____
Address_____
City_____ State_____

Cowles CHEMICAL COMPANY
CLEVELAND 3, OHIO

See Cowles Advertisements on pages 95 and 103

Corrosion Resistant Paint

Speco, Inc., Dept. MF, 7308 Associate Ave., Cleveland 9, O.

Rustrem MS, a new "one coat" rust and corrosion resistant paint that can be satisfactorily applied even over damp metal surfaces, combines a heavy bituminous alkyd base with a special penetrating vehicle, and is reputed to cut through moisture to surface metal. It is especially recommended for winter applications or use where it is virtually impossible to thoroughly dry a metal surface.

The paint forms an attractive, shiny black elastic coating that resists dampness, mild industrial acids and fumes, grease, oil, drying effects of sun and extreme temperature changes. In addition, it is said to retard the corrosive effects of salt water and salt-laden air.

The material is available only in black in 1-gallon cans, 5-gallon pails and 55-gallon drums. It can be applied by brush, spray or roller.

Additional information on this corrosion resistant paint may be obtained by writing directly to the above manufacturer.

25 MILLION POUNDS ON THE MOVE

Everything from Anodes to Zinc Salts at the Eighteen Udylite Stock Points . . .

Through the new Udylite warehouse in Detroit and through the other seventeen stock point warehouses, located strategically throughout the United States, supplies constantly move to electroplaters all over the world to the tune of over 2 million pounds a month.

These "close at hand" warehouses mean savings to you on freight—they provide for faster deliveries.

And every item has had to meet the exacting chemical and metallurgical tests of Udylite Laboratories.

These eighteen Udylite warehouses have been established to meet your requirements. More are to come as the need develops.

Wherever you are, whatever you need, whenever you want electroplating supplies, Udylite is your best bet.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Control of Chromic Acid Mist

Zero-Mist, the new surface-active additive for chromium plating solution control has been given enthusiastic approval by chromium platers. This new product has not only shown dollar savings to platers but has greatly improved health conditions in the plating room.

Udylite Zero-Mist is a completely stable, surface-active additive for decorative chromium plating baths which eliminates the usually troublesome mist and spray. When Zero-Mist is added, a thin curtain of foam forms at the surface of the solution which contains the mist and spray which are evident when Zero-Mist is not used.

While Udylite does not recommend elimination of proper ventilation in any chromium plating operation, there are reports of many platers using Zero-Mist successfully without washing the exhausted air. Zero-Mist has also proved to be of great benefit in plating rooms where wide tanks are difficult to ventilate, or where tanks of normal width are located near windows or doors, since it prevents the blowing of mist and spray due to the cross-currents of air.

From the dollar standpoint, Zero-Mist has shown remarkable savings to platers. Losses of chromic acid from mist and spray in the solution can amount to as much as 40%. When dragout losses are also included, tests have shown Zero-Mist to cut chromic acid waste up to 70%.

Temperatures of the chromium plating solutions have no deteriorating effect upon Zero-Mist. Additions are only required to replace the minor losses from dragout. Boiling concentrated chromic solutions do not break down or destroy its effectiveness, neither do the highest anode or cathode current densities. It is easy to maintain—very simple to control.

Zero-Mist acts by lowering the surface tension of a chromium plating solution. Because of this action, the solution runs off of the work rapidly when it is withdrawn from the tank and only a thin film remains.

The concentration of Zero-Mist for the complete suppression of mist and spray varies with the bath temperatures, especially its surface temperature. With lower temperatures, lower concentrations of Zero-Mist can be used.

ADVERTISEMENT

A Standardized Machine for Plating

To meet the increasing demands for higher plating production and at the same time offer a plating and processing machine at lowest possible initial cost. The Udylite Corporation recently announced it's new Cyclemaster. Udylite engineers say this new, completely automatic plating machine offers the greatest production of any machine built with comparable floor size.

The essential reason for its low initial cost is standardization. All Cyclemaster models have the same overall length, width and height. The only changes made are in the lengths of the various process tanks. These are changed to accomodate the desired cycles of plating, or processing and the rack size selected.

Each machine is 41 feet, 6 inches in length, of sufficient size to be ideal for cadmium and zinc plating and for copper-nickel-chrome too, where the cycle will fit into its standard length.

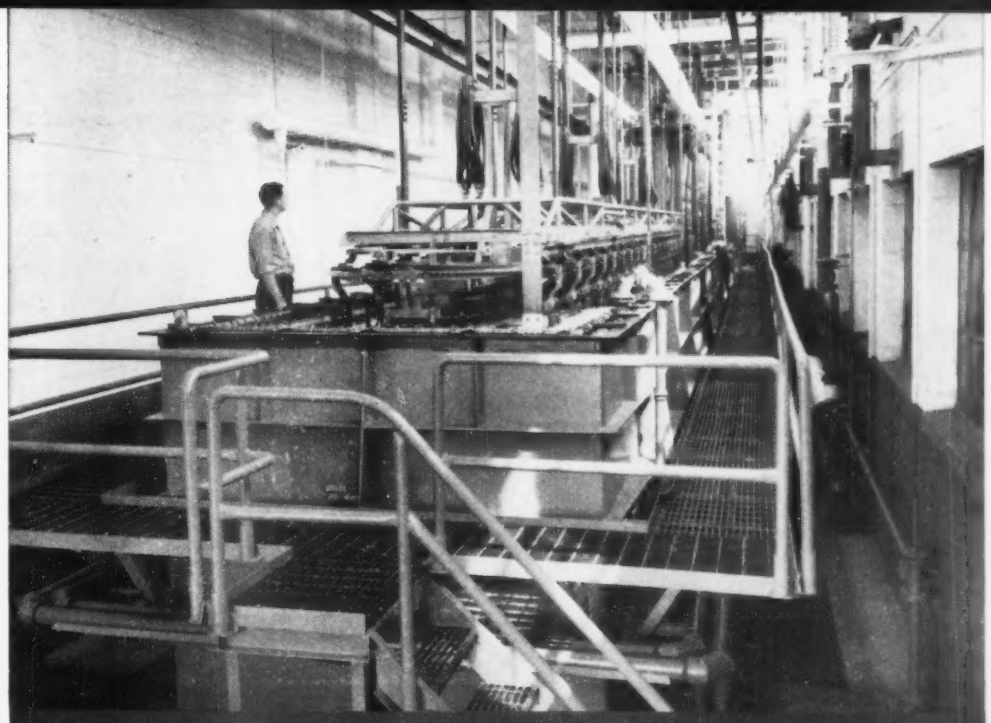
The new Udylite Cyclemaster is a fully automatic machine. Its operation is so simple that any regular shop man can keep it operating at full capacity. One man can handle both loading and unloading of the plated parts.

An important feature of this new machine, is a new standard multi-purpose carrier. It can be used for double spline or single spline racks. Made of special alloy metal, it has high structural strength and highest conductivity. The new carrier can also be easily adapted to inside anode plating if desired. With this carrier design the current travels only six inches from the cathode rail to the rack.

The Cyclemaster design follows many basic features incorporated in all Udylite machines. Rack spacings can be varied in individual tanks; machine is operated by hydraulic mechanism permitting variable speeds for lift, lowering or horizontal movement of racks in and out of solution; horizontal transfer of the work carriers is accomplished by a simple tee member pusher mechanism operated hydraulically.

Also, like other Udylite Fully Automatic machines the Cyclemaster is completely assembled at the factory and run in before being shipped to the customer as a complete unit.

ADVERTISEMENT



MAINTAINING THE PACE OF MASS PRODUCTION

This Udylite Machine Cleans, Plates and Processes 480 Auto Grilles per hour AUTOMATICALLY

A complete production operation—applying nickel-chrome plate to steel radiator grilles—is handled by three men and this Udylite machine. The entire operation of cleaning, plating and rack strip are handled by the machine—the loading and unloading of parts are the only manual operations. The stampings are approximately 8″ x 36″ in size and to assure them of a flawless finish Udylite installed a Horizontal Cathode Agitator. In addition, a high current density chrome strike is applied before the chrome plate.

This is just one more example of how Udylite machines are meeting the pace of mass production. And Udylite machines are adaptable to practically any metal finishing operation you can name. Why don't you find out more about how Udylite can fit into your operations? Just call your nearby Udylite representative or write direct for the full details. There's no obligation.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

HANDY & HARMAN SILVER ANODES

Regardless of form, all Handy & Harman Silver Anodes are made of the same super-fine silver—silver fabricated by an exclusive production process that... maintains the highest standards of fineness... removes every trace of impurities detrimental to plating... assures consistent uniformity. These 999+FINE Anodes are turning out top-quality, trouble-free plating for thousands of manufacturers. They'll do the same for you. TRY them and see the difference.

A WORD ABOUT REFININGS

Send your silver plating solutions and other precious metal scrap, sweeps and waste to us for refining. Specially perfected scientific methods and equipment plus highly skilled technicians and long experience assure you of an *accurate return* from every lot. Send us your next shipment and let returns speak for themselves.

HANDY & HARMAN FOUNDED 1867 QUALITY · SERVICE

SHIP REFININGS TO THE NEAREST OF THESE PLANTS

HANDY & HARMAN

GENERAL OFFICES: 82 FULTON STREET • NEW YORK 38, N. Y.

Bridgeport, Conn. • Providence, R. I. • Chicago, Ill. • Los Angeles, Calif. • Toronto, Canada

WEST COAST	CENTRAL U. S.	EAST COAST			
3625 Medford St. Los Angeles 63, Calif.	1900 West Kinzie St. Chicago 22, Ill.	82 Fulton St. New York 38, N. Y.	44 West 46th St. New York 36, N. Y.	Bridgeport 1 Conn.	425 Richmond St. Providence 3, R. I.

Bright Nickel Process

Hanson-Van Winkle-Munning Co., Dept. MF, Matawan, N. J.

A new high-speed bright nickel plating process called Levelume is claimed to be the first bright nickel process to combine qualities of full brightness, high leveling and exceptional speed.

Practically any existing nickel plating process can be converted in a matter of a few days, according to the above company. No special auxiliary equipment need be installed. Tanks only have to be cleaned and bleached. Almost any rubber-lined tank previously used with bright nickel solution can be employed with the new process.

The manufacturer reports the following additional advantages:

1. The deposit is also characterized by good ductility and controlled stress in either the compressive or tensile side, which means no cracking, crazing, lifting or brittleness of deposits.
2. It is effective within a wide current density range—from 20 to 150 a.s.f. (normal 60 to 100 a.s.f.).
3. The high leveling characteristics of the deposit fill in scratches to a degree which, in many cases, eliminates polishing and buffing for extra smoothness after plating; or considerably reduces required post-treatment, with subsequent reductions in production costs.
4. Objects can be double coated, if higher corrosion protection with a given nickel thickness is desired.
5. The process produces deposits with high surface activity, thus plated surfaces accept chromium and other deposits without additional treatment.
6. Recessed areas have uniform brightness without shading.

The bath is stable in operation, produces pleasing white color deposits, is simple to control, has high tolerance to impurities and low operating costs. With the bath agitated and continuously filtered, roughness of deposits is not encountered.

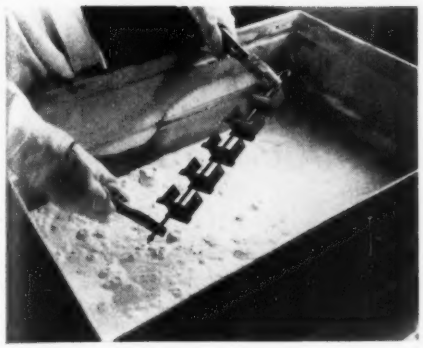
Plating temperatures range from 145°-160°F., with 145° normal for plating zinc die castings, 160° normal for steel. pH runs between 2.7-3.5 electrometric. Ventilation is optional, as the bath gives off no harmful or unpleasant odors.

Plastic Coating Process

Polymer Processes, Inc., Dept. MF, Reading, Pa.

A new method of coating metals, ceramics, glass and wood with various types of plastic materials, licensed exclusively by the above firm in this country, was invented in Germany by the firm Knapsack-Griesheim A. G. of Frankfurt-am-main under the name whirlsintering. It will be known in the United States as the Whirlclad process.

Preliminary experience has been based largely on the use of nylon and low-pressure polyethylene as the coating mediums. However, many other



materials can be used which melt sufficiently below their degradation temperatures. These include polystyrene, cellulose acetate, butyrate, acrylics and epoxy resins. The process is said to permit use of coating materials which never before have been applied satisfactorily. The polymers used are prepared in finely divided solid form especially for the process, but are essentially pure in that they normally contain only minor modifying agents. No plasticizers or solvents are required.

The method is reported to require relatively inexpensive apparatus. It consists essentially of dipping preheated articles into a fluidized bed of plastic material in finely divided solid form. Much heavier coatings can be obtained with a single dip than is customary with solvent coating methods. The melting point of the material to be coated must be higher than that of the coating material. Very satisfactory adhesion is obtained. However, to obtain the best adhesion, the surface of the article to be coated is roughened by blasting with angular shot.

The process is said to produce evenly distributed, uniform coatings on the base material, including irregular shaped objects and pipe interiors. Since the process is performed with the coating material in a solid, nonliquid form, there is less chance of irregularity in material flow. The coating materials are not applied in combination with plasticizers or extenders. Thus there is no chance of such agents affecting the ultimate chemical or mechanical performance of the coated surface.

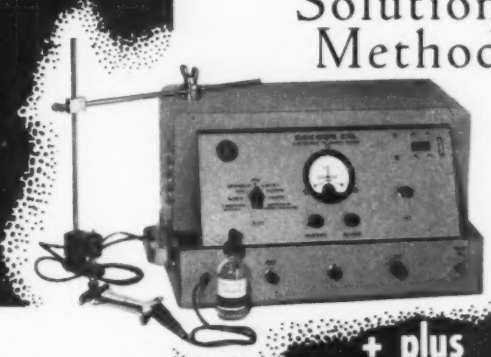
Coating thicknesses for nylon and Polypenco K-51 have ranged from 0.008" to 0.020", while thicknesses for polyethylene have been between 0.010" and 0.040". Uniformity has been generally satisfactory for the required end use. Where very close tolerances or thinner coatings are desired, the coatings are machined or ground to the proper dimensions.

Parts can now be coated up to a rectangular size of 18" x 26" x 48". Equipment will soon be available to accommodate pieces up to 37" x 37" x 76". Considerably larger equipment is under development. Metals thinner than 0.040" are hard to coat because they do not maintain the necessary heat during the coating process.

The company has a standard licensing program for those companies desiring to do their own coating in larger production quantities. The necessary equipment to operate the process is also available under this licensing program. A continuous system has been designed for volume coating jobs.

Check plating thickness
WITH THE
KOCOUR ELECTRONIC THICKNESS TESTER*

*Anodic Solution Method



6 Simple steps . . . to quick, accurate results

1. MOUNT THE CELL . . . on the spot to be tested and clip lead wire to specimen.

2. ADD TEST SOLUTION . . . which corresponds to the type of plating and base metal tested.

3. PLACE STIRRER IN POSITION.

4. SET SELECTOR SWITCH to the type of plating to be tested as indicated on panel.

5. PRESS THE TEST BUTTON to start the test . . . and upon completion the unit shuts off automatically.

6. TAKE THE READING directly from the counter on panel i.e., 0.00041".

TOTAL TIME . . . less than 2 minutes

+ plus these features

- DETERMINE THICKNESS OF
  decorative chromium
  heavy chromium
  silver, copper
  tin, brass
  cadmium, nickel
  zinc, lead
  lead-tin alloy
  tin zinc alloy
  on various base metals and materials.
- WIDE THICKNESS RANGE
- DIRECT READINGS
- 90-95% ACCURACY
- TESTS ARE RAPID
- VIRTUALLY AUTOMATIC
- ELIMINATES HUMAN ELEMENT

Don't delay! See how the Electronic Thickness Tester can solve your problem. Write for literature today.

KOCOUR CO.
Pioneers in Control for the Plating Industry

4802 S. ST. LOUIS AVENUE
CHICAGO 32, ILL.

Sintered Metal Filter

Purolator Products, Inc., Dept. MF, Rahway, N. J.

Capable of handling fluids ranging up to 1,000 degrees Fahrenheit, the new filter can take flow rates comparable to any high temperature filter in existence with lower differential pressures and a better degree of filtration, according to company engineers.

Made of sintered metal, the new filter can remove particles as small as one micron in size from a wide range of fluids, including such materials as nitric acid, hydrochloric acid, sulphuric acid, phosphoric acid and strong alkalies.

The one-piece sintered element can

how to beat the nickel shortage

Compare the present price you are paying for nickel . . . if you can get it . . . with the current price of zinc.

Zinc treated with KENVERT films, in many cases, can produce brightness and sales appeal, as well as corrosion protection, equivalent or superior to nickel.

Because zinc is a soft metal, and where hardness is a factor, an additional lacquer film may be necessary.

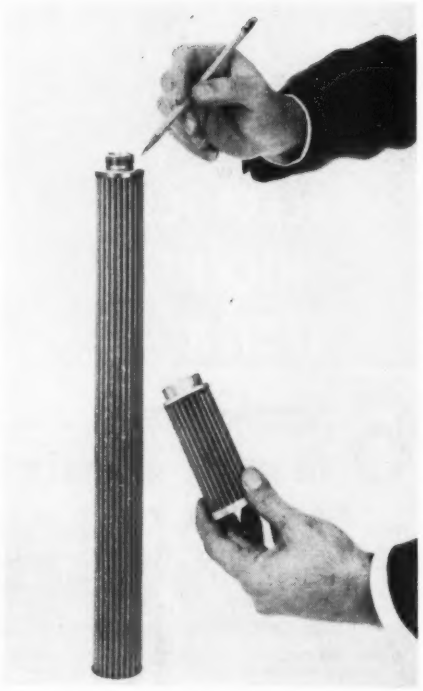
It will pay you to investigate KENVERT chrome sealer bright or colored films immediately. Send us detailed information on your requirements. Our laboratory is ready to consult with you or treat samples at no obligation.

KENVERT acid solutions are packaged in handy Polyethelene steel drums. Some are available in powdered form.

Distributorships available in a few territories

CONVERSION CHEMICAL CORPORATION

98 E. MAIN STREET, ROCKVILLE, CONN.



be made in a variety of diameters and lengths and its radial fin construction can be supplied in specified depths and numbers of convolutions to give extended area within a confined space. Varying flow rates are also available. Filters of stainless steel, Monel and other metals can be made as required.

Other features of the new filter are its controlled permeability and uniform porosity which can be varied as to pore size desired. Its makers say that it has a higher degree of porosity per square inch than is available in any other high temperature, metallic filter element. It can handle differential pressures of up to 500 pounds per square inch. Either internal or external threaded connections can be provided by the above manufacturer.

Dust Collector

Aget Mfg. Co., Dept. MF, Adrian, Mich.

A new model Dustkop dust collector, to be used expressly where the outside expulsion of the cleaned air is necessary or demanded, is known as the 11NW50 and is specifically designed for outside air exhaust, where application of recirculating air collectors is not practicable or is prohibited by local regulation. The unit is also adaptable to be used at installations where toxic fumes, obnoxious odors or smoke, as well as dust, accompany the operation for which the collector is used. The collector does not remove the fume or odor from the air but

The abbot and the Bishop's Candlesticks

The Bishop was upset. How could he possibly have 500 dull, tarnished brass candlesticks polished and gleaming in time for tomorrow's special candlelight services?

The *abbot* was quite calm. He *knew* the answer to the Bishop's dilemma and in less than twenty-four hours, he returned from his laboratory with the candlesticks — bright and glistening.

How did he do it?

Articles made of brass and other metals may be readily burnished and tumbled with Abbott Burnishing Materials. Made in six scientifically designed shapes, Abbott Burnishing Materials make efficient and uniform contact on metal parts and castings of every conceivable size and shape. Economical to use, they are *deep hardened* and have a mirrorlike glass-hard surface for extra long life. Combined with the Abbott Vertical Tumbling Barrel, they make the perfect barrel finishing combination.

If you have a special barrel finishing problem, let the abbot help you solve it. Just write us.

ABBOTT

The ABBOTT BALL Company
1052 New Britain Avenue
Hartford 10, Conn.

merely exhausts it out of doors through a pipe which is connected to the outlet collar at the top of the cyclone separator. The machine has an increased capacity up to 64 gallons. The collector is ruggedly built with framework of welded angle iron and dust drums of heavily reinforced sheet metal. Unloading maintenance is simplified by virtue of a wire reinforced neoprene flexible hose which connects to the rubber castered storage cans individually, and to the collector by a diverting "Y" to divert the flow of dust to one can while the other is removed for dumping.

Regulated D.C. Power Rectifier

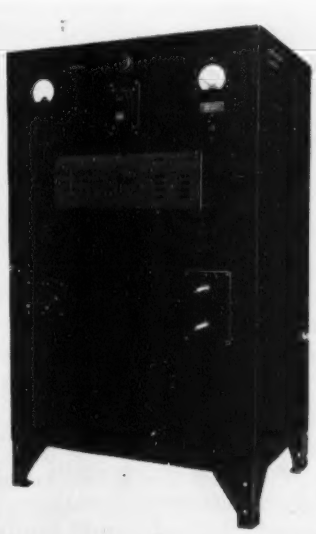
Rapid Electric Co., Dept. MF, 2881 Middletown Rd., Bronx 61, N. Y.

A regulated, 14-28 volt, 200/100 amps. d.c. power rectifier has been designed to meet Air Force specifications MIL-P-8194 and MIL-P-6457A.

Operating on 220/440 volts, 3 phase, 50-60 cycles, the output voltage regulation from no load to full load is held within 0.5 volts, including a variation of ±10% of the rated input voltage.

The cabinet is of black wrinkle finish, measuring 41½" H x 24" W x 18" D. Automatic controls include such safety features as air flow switches to guard against possible fan-motor ventilation failure, and thermal relay protection against prolonged current overload. Failure of any phase of input will shut power supply off instantaneously.

Periodic air-cleaning of selenium rectifier stacks is all the maintenance required. Self-lubricating fan-motor



These ANODES cut costs

These are Federated's exclusive Conducta-Core anodes, the most economical lead anodes for modern chromium plating operations.

Conducta-Core anodes last up to three times as long as other lead anodes. The highly conductive and non-contaminating aluminum core rod runs the full length of the anode so they cannot warp or buckle. The Conducta-Core anode is designed with a greater number of high projections to give much improved throwing power and openings to provide self-cleaning action.

Let Federated serve as your single source for all plating materials. Copper, lead, zinc, tin, cadmium, brass and other non-ferrous anodes; high-quality full nickel content nickel salts; Zimax brighteners, in liquid and powder forms, for all types of zinc plating; Cadmax liquid brighteners for cadmium plating.

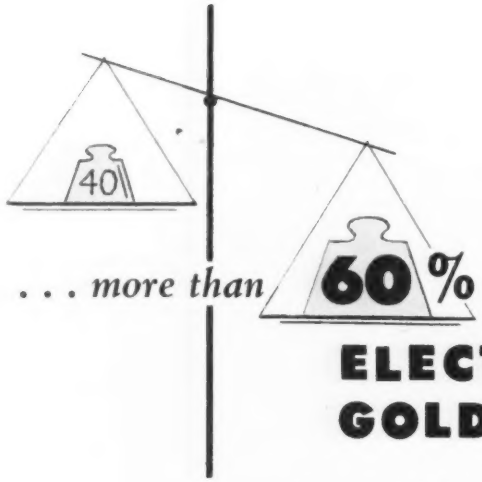
Think of Federated first when you need quality plating materials. Write directly to us for additional information on any of our plating products. Or get in touch with your nearest Federated Distributor.

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Federated first in the non-ferrous field — FMD

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust



. . . more than **60%** of your

ELECTROPLATING GOLD *may be* ***Wasted***

You may be reconciled to wastage, but do you realize its exorbitant cost? In our work with Electroplaters, we regularly find losses as great as $60,000 or more of every $100,000 paid for gold. Usual causes are outmoded equipment and inefficient electroplating methods and solutions.

You can correct these conditions with Technic aqueous gold solutions and Technic-engineered installations. Your cost can drop to a record low figure — while you increase efficiency and achieve predetermined standards of deposition that can be repeated indefinitely.

Our Engineering Service is available, without obligation. We can tell you how to bring existing operations under scientific control — or to initiate new operations custom-engineered to do the job right. And our proposals are backed by successful experience with problems like yours.

TECHNIC, INC.

39 Snow St., Providence, R. I. • JAckson 1-4200
Chicago Office • 7001 North Clark St.

The World's Best Soluble Gold and Rhodium

bearings eliminates necessary lubrication.

Technical details in Booklet H-1 are available upon writing the manufacturer.

Alloy Electrodeposit of Zinc and Copper

Promat Division, Poor and Co., Dept. MF, 851 S. Market St., Waukegan, Ill.

An alloy electrodeposit of zinc and copper, identified as new Probrite, may be plated full bright in thicknesses up to 0.0003″ or may be plated full to a thickness of 0.0001″, and buffed to full brightness, according to the above manufacturer. The buffing grade has excellent flow-out and eliminates the necessity for using plating grade quality finish base material.

These bright deposits may be chromium plated for added color and sealed in the firm's Proseal S-30-A for protection against the formation of white corrosion products.

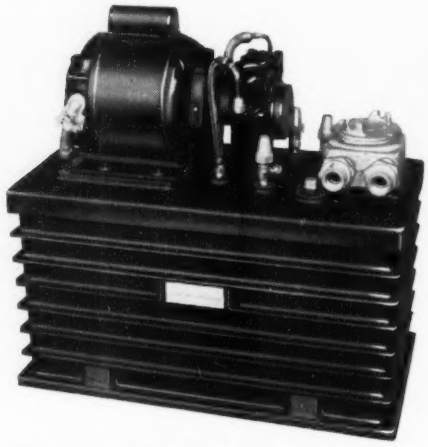
Although widest use is found in indoor application the new improved process meets the requirements of many outdoor applications.

One of the principal advantages is the availability of the metals which make up the deposit. Recent improvements in bath control methods and modification of brightening agents have resulted in reducing the original cost of the process.

The company offers complete technical data and processing procedure upon request.

Master Controller

Engineering Div., The Swiss Colony, Dept. MF, Monroe, Wis.



The Electronic-Hydraulic Master Controller

A new electronic-hydraulic master controller is stated to provide full modulating control of pressures, voltages, temperatures, and speed. It may be mastered to any control job.

The self-contained unit contains only one moving part, making it practically frictionless and maintenance-free. As a master controller for steam production, only the size of the valve attached governs the load limit.

Centerless Polishing Machine

Production Machine Co., Dept. MF, Greenfield, Mass.

This machine will handle bar stock up to 1″ diameter, and tubing up to 3″ diameter, any length, within the weight limitations of the machine.

It is built to machine tool tolerances, and the unit employs abrasive belts running over a hardened steel contact roll as cutting medium. The feeding unit is also an abrasive belt with flat platen which permits center line contact with work piece at any feeding angle. These features, exclusive on the firm's machines, eliminate the need for periodic dressing of grinding or regulating wheels.

The feed unit may also be equipped with reversing traverse device when multiple passes are required. It is mounted on dovetail ways and is adjustable by feed screw and hand wheel with infeed graduations in increments of .0002″ for precision size control.

The work guides are easily adjustable for various sizes of work.

The work rest blade can be furnished

in a variety of materials depending on the type of metal or material being ground.

Specifications:

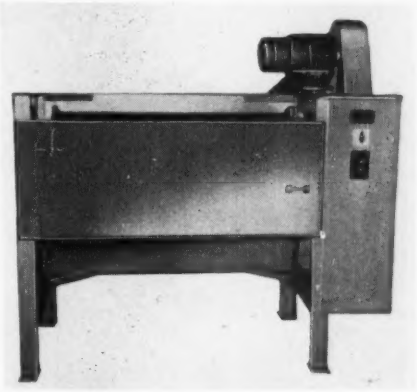
Capacity — 1/8" to 3" dia.
Size of grinding belt — 4" x 86".
Belt speed — 3,500 SFPM.
Size of feed belt — 6" x 29¾".
Feed belt speed — Variable.
Main drive motor — 3 H.P., 1,200 R.P.M.
Feed drive motor — ¼ H.P., Varidrive.
Coolant system — ¼ H.P. recirculating pump.
Floor space — 60" x 50".
Shipping weight — 2,000 lbs.

Combination Barrel Finisher

Rampe Mfg. Co., Dept. MF, 14915 Woodworth Ave., Cleveland 10, O.

Made in any interchangeable combinations of barrels—2, 4, 6, or 8 cu. ft. capacity—with total capacity of 8 cu. ft., this new V-8 barrel finisher provides a versatility that will meet all requirements. Another noteworthy feature is the novel and improved power drive, direct gears, no chains or sprockets, providing low maintenance cost.

A safety gate in front of the machine completes the all around protection of the unit. A 1½ H.P. magnetic brake motor with jogging and reverse switch provides adequate power. Other specifications are: Variable speed drive; waterproof start-stop switch mounted in the front panel; and antifriction bearings. These additional features are claimed to boost the versatility of the unit. Barrels can be



furnished with no-seam vinyl plastic lining which gives extra wear and chemical resistance.

Further information on this barrel finisher may be obtained by writing to the above address.

Just hanging soiled metal parts in a tank of soak cleaner won't necessarily get them clean. You've got to be sure that the cleaner *gets into the soil.*

You *can* be sure with . . .

Cowles **NS SOAK CLEANER**

Cowles NS Soak Cleaner penetrates deep into crevices and recesses to wet-out crusty soil deposits. Emulsifies oil and grease. Disperses drawing, stamping and buffing compounds.

No scum on the cleaning tank to foul cleaned metal coming out. Clean it with Cowles NS Soak Cleaner and it stays clean.

Send this coupon for Technical Bulletin

Cowles Chemical Company
7014 Euclid Avenue
Cleveland 3, Ohio
Please send Cowles NS Bulletin
Name_____
Company_____
Address_____
City_____ State_____

Cowles CHEMICAL COMPANY
Cleveland 3, Ohio

See Cowles advertisements on pages 87 and 103

BUSINESS ITEMS

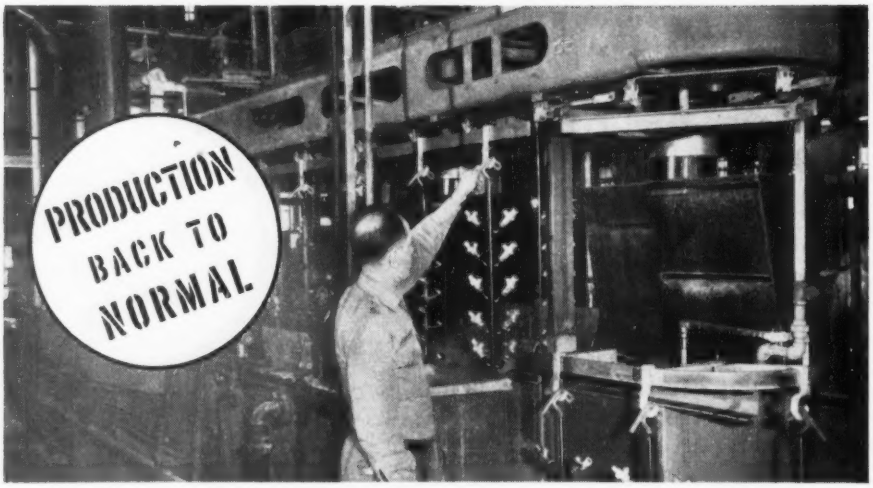
Industry Editors to Judge Electroplating Course Contest

Joseph B. Kushner Electroplating School of Stroudsburg, Pa., announces that *Nathaniel Hall*, editor of METAL FINISHING, *Ezra Blount*, editor of *Products Finishing*, and *Archimedes Doria*, editor of *Plating*, will act as judges of the school's annual essay contest for a free home study course in modern electroplating. The course offered as the prize has a cash value of $125.

The winner of the scholarship contest will receive the complete "Electroplating Know How" course.

The two next best entries will each receive a handy instrument for measuring the surface tension of plating baths and dips, worth $16.35. The four next best entries will each receive a set of three solid vinylite trouble shooting charts that mount right at the plating tank for convenient reference, worth $9 a set. Every contestant will receive a free copy of the valuable booklet, "Surface Tension Secrets for Electroplaters."

The contest is open to anyone associated with the metal finishing industry. Previous winners have ranged from a plater's helper to an executive chemist. To enter the contest, the con-



. . . thanks to M&T copper-tin BRONZE

AS AN UNDERCOAT FOR CHROMIUM, M & T copper-tin Bronze plating is helping nickel-short platers to solve some of their most critical production problems.

1. In decorative chromium plating, it lets you cut down on the nickel, cut out the copper.

2. Plating speeds and filling power are excellent—speeds up to .0001 inch per minute are possible.

3. Corrosion resistance and leveling action are good.

4. It plates bright or dull, buffs easily, has good ductility.

5. It is economical, easily controlled —employs a cyanide-stannate bath.

AS A FINAL DECORATIVE FINISH, M & T Bronze is gaining wide acceptance for wire goods, hardware, costume jewelry, and other items requiring a gold-like finish.

Write for more information on copper-tin Bronze or the other M & T tin plating processes —High Speed Tin, Tin-Zinc and Tin-Nickel.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
RADIOGRAPHIC EQUIPMENT
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

"First Name in Tin Chemicals"
METAL & THERMIT
CORPORATION
100 EAST 42nd STREET • NEW YORK 17, N. Y.

testant must submit along with his official entry blank, fifty words or less, completing the following statement: "There are now more opportunities than ever in the electroplating field because. . ."

Entries will be judged solely on originality, clearness, and sincerity of thought. Fancy rhetoric will not count. The decision of the judges will be final.

Official entry blanks are available without obligation on application to Electroplating Scholarship Contest, Box 230, Stroudsburg, Pa. The contest closes May 30, 1956 at midnight. Entries postmarked after this date will be ineligible. Prize winners will be announced as soon as possible after the contest closes.

Badaluco Appointed Assistant Vice-President at Hanson-Van Winkle-Munning

Hanson - Van Winkle - Munning announces the appointment of *James A. Badaluco* to the post of Assistant Vice-President. He continues in his major responsibilities as manager of national buffing compound sales and becomes senior executive at the *J. C. Miller Division* in Grand Rapids, Mich.

Frederick W. May continues in his present responsibilities as Manager of Sales, J. C. Miller Division, and in addition becomes the next ranking executive at Grand Rapids. Mr. May joined the Miller organization in March, 1945, as Sales Manager. Prior to that he was with *The Electric Auto-Lite Co.* of Toledo, Ohio, for 18 years, serving as Assistant Director of Purchases from 1935 to 1945.

James A. Badaluco

Mr. Badaluco began his career with the company in 1937 as a chemical engineer. In 1945 he became chief engineer of that company, in charge of the plating phase of the business. In 1951 he became a vice-president in charge of research and development of J. C. Miller, and in 1953 was made executive vice-president of that firm.

He continued with J. C. Miller when that company was acquired by Hanson-Van Winkle-Munning in 1954, and has since functioned as national sales manager of buffing compounds.

Mr. Badaluco is a past president of the *Grand Rapids Branch* of the *American Electroplaters' Society*. He is also a member of the *American Society for Metals* and of the *American Society of Testing Materials*.

Frederick W. May

Edwards and McCormick Assigned to Pennsalt's Pittsburgh District

Gene Edwards

Pennsylvania Salt Mfg. Co.'s Metal Processing Department has announced the appointments of *W. Scott McCormick* as sales representative and *Gene Edwards* as technical service engineer for the Pittsburgh district.

Mr. McCormick who formerly handled maintenance chemicals exclusively for railroad accounts in Ohio, West Virginia and western Pennsylvania, will, in addition, service accounts on metal processing products in Pittsburgh.

He received his education at Grove City College and Purdue University and was associated with the Brush

W. Scott McCormick

Electronics Co. of Cleveland before joining Pennsalt in 1954.

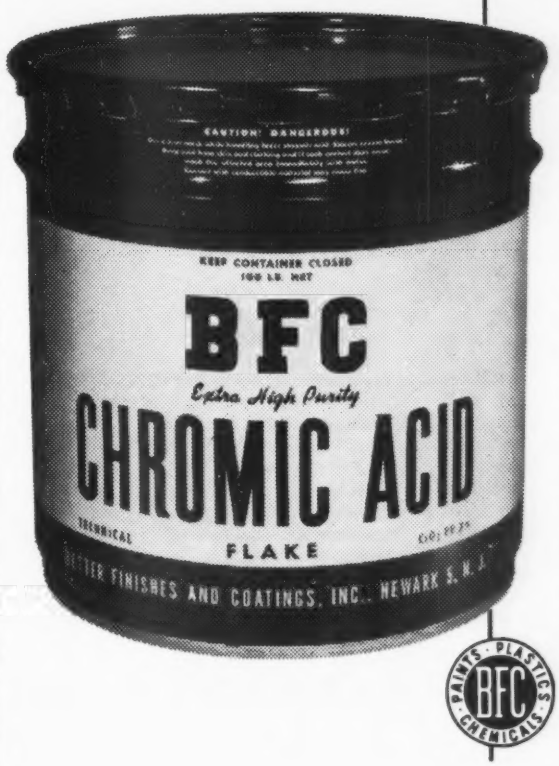
Gene Edwards was associated with Gilron Products Co. for six years when that organization was acquired by Pennsalt in November 1954 and later integrated with its Metal Processing Department. He has had 20 years experience in the metal working industry having served as supervisor of plating, Standard Steel Spring Co. in Coraopolis, Pa. and as superintendent of plating for the Chrysler Corp.'s Lynch Road plant at Detroit. Mr. Edwards will operate out of Cleveland, O.

extra high quality

CrO_3

Every batch checked!

99.75% pure



It's a fact. We check the purity of *every batch* of BFC Chromic Acid by our own special test in a plant lab located only a hop-skip-and-a-jump away from the flakers. Not a drum moves from plant to warehouse until the lab says, "OK".

We don't know any better way than 100% check-testing to keep our quality up . . . and complaints down. Do you?

BETTER FINISHES & COATINGS, INC.

268 Doremus Avenue, Newark 5, N. J.

2014 East 15th Street, Los Angeles 21, Calif.

Circo Equipment Company to Double Capacity

Plans have been announced to double the size and facilities of *Circo Equipment Co.'s* Rahway, N. J. plant, at an anticipated cost of $100,000.

The expanded plant, at 51 Terminal Ave., will have 14,000 sq. ft. of general production area and 2,500 sq. ft. of engineering space added to the existing 24,000 sq. ft. It will be of reinforced steel, masonry and matching brick with sturdy supportive members and concrete flooring to withstand the weight and operating stress of overhead cranes and heavy production machinery. Offices will be air conditioned and the entire plant serviced by a modern ventilating and heating system. Scheduled for completion in June 1956, the plant will be provided with additional new machinery to streamline and speed fabrication and assembly.

Photo courtesy: Hanson-Van Winkle-Munning Co.

PERMANENT PROTECTION . . .
. . . Against Corrosion, Contamination, Abrasion

Manhattan Rubber Linings give you the kind of cost-saving protection you need in metal plating and pickling operations. They are made from multiple calendered sheets of rubber, bonded so securely mechanical pull tests prove they can't be separated! This means you get *lasting* protection against corrosion of your equipment or contamination of solutions used in processing . . . *positive* protection from the dangers of stray currents in plating operations. It's the kind of *permanent* protection that has kept many Manhattan Rubber Lined plating tanks in continuous use for over 30 years!

Any equipment that can be shipped can be lined by Manhattan. Every tank lined by Manhattan is tested under high voltage to detect any possible imperfections before it is shipped back to your plant.

For perfect, bonded protection of your costly equipment . . . *permanent* protection against corrosion, contamination and abrasion . . . consult the R/M rubber lining plant nearest you.

RM 623

RUBBER LINING PLANTS AT PASSAIC, N.J. • NORTH CHARLESTON, S.C.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY
RAYBESTOS-MANHATTAN, INC.
Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose
Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles
Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Miller to Represent Pennsalt Metal Processing Department

Jay Miller, chemical specialties representative of the *Pennsylvania Mfg. Co.* has taken on additional responsibilities for the Metal Processing Department in his south central Pennsylvania territory. He formerly handled maintenance chemicals for railroad accounts exclusively.

Mr. Miller will continue to serve the railroads and in addition will offer the company's full line of industrial metal cleaners to the metal processing industry in Allentown, Reading, Harrisburg, Lancaster and York. *Brooks Ricca*, who formerly served these accounts, is now servicing the Philadelphia area.

Jay Miller

Mr. Miller, a native of Lancaster, Pa., has been associated with the firm since 1953. He lives at 407 College Ave., Lancaster, Pa.

John E. Hunt Named Vice-President of Wagner Brothers, Inc.

John E. Hunt

John E. Hunt has been elected vice-president of *Wagner Brothers, Inc.*, Detroit manufacturer of metal finishing equipment and supplies.

Mr. Hunt obtained his B.S. degree at Wayne University, Detroit in 1939. His widely diversified experience in the metal finishing field includes control engineering & development, and production control. He is presently a registered professional engineer in the states of Illinois and Michigan.

Hunt joined the company as supervisor of the Detroit technical staff in 1946. He was named Chicago district manager in 1952. He will continue as Chicago district manager from offices at 1929 North Paulina St., Chicago 22, Ill.

Nicholson Named General Manager of Product Sales for Stokes

Charles V. Nicholson, formerly manager of the International Division, has been appointed general manager of product sales for *F. J. Stokes Machine Co.*, Philadelphia, Pa. Reporting to *A. A. Hutchings*, vice-president in charge of sales, Mr. Nicholson will direct all headquarters sales and marketing activities, both domestic and international, for all of the firm's lines, which include high vacuum equipment.

A native of Pittsfield, Mass., Mr.

Nicholson was graduated in 1933 from the Wharton School of Finance and Commerce, University of Pennsylvania, with a B. S. in Economics. He joined Henry Disston and Sons, Inc., in December, 1936, as a junior salesman and sales promotion representative for both hardware and industrial

Charles V. Nicholson

products and rose to manager of Disston's export division before joining the Stokes organization in June, 1954.

During World War II, Mr. Nicholson enlisted in the U. S. Air Force, rising to the rank of captain, and served at several Air Force bases as budget and fiscal officer, traffic officer, contract termination and renegotiation officer, and production control offier.

Knight Advanced by National Research Corporation

The promotion of *Richard A. Knight* to assistant to the general manager has been announced by the Equipment Division of *National Research Corp.*, Newton Highlands, Mass. In his new post, Mr. Knight will co-ordinate the activities of the sales, engineering, and production departments. He was formerly assistant manager of the sales department.

Wikner Returns to Magnuson

Magnuson Products Corp., manufacturers of specialized chemical cleaning compounds, have announced the return of *Nils Wikner* to their sales organization.

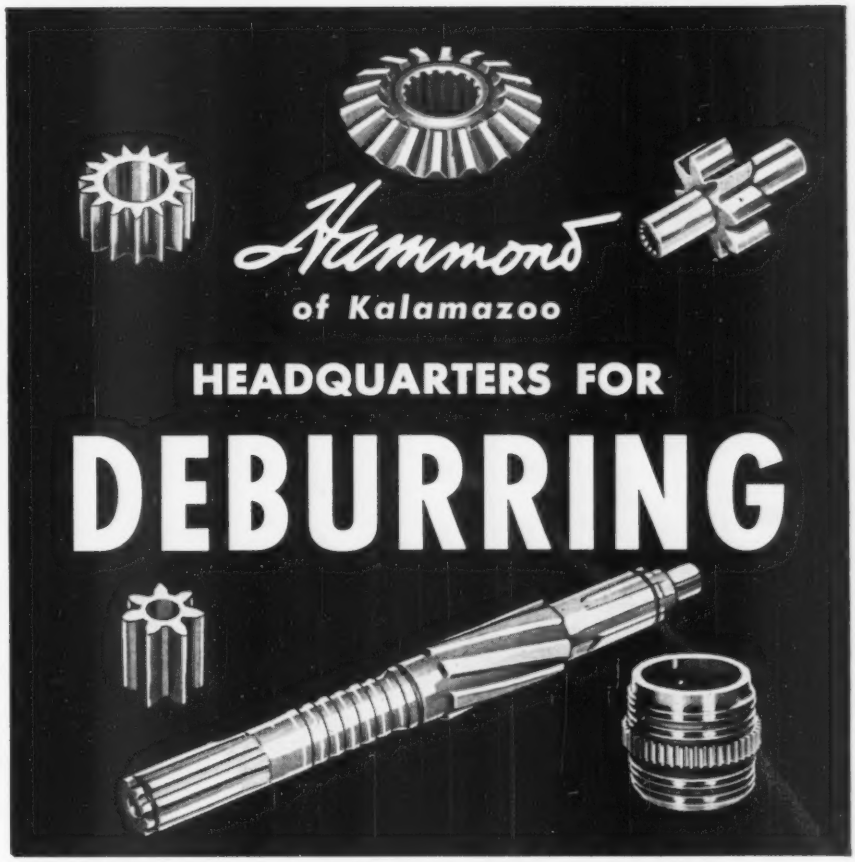
Mr. Wikner, who has just returned from a tour of active duty in Korea, has been asigned to the western New York and northwestern Pennsylvania area. He will be operating out of Buffalo and servicing all accounts in that area.

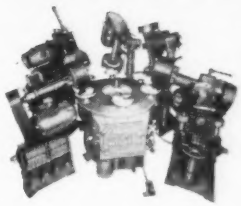
Nils Wikner

Neilson Chemical Company Celebrates 25th Anniversary

The *Neilson Chemical Co.* was founded in March 1931, by Raymond H. Neilson, at a time this country was entering the depths of the depression. At that time the total space occupied was less than 2,500 square feet, and the principal product was a phosphoric acid process for treatment of automobile bodies, refrigerator cabinets, trucks and trailers before painting.

In 1939, operations were further enlarged by the opening of a branch manufacturing plant, again with its own sales organization, in Los Angeles,





Hammond Automatic Deburring Machines will increase production, assure a uniform finish, reduce operator fatigue and save floor space.

Send sample parts for complete engineering report.

Hammond Machinery Builders INC.

1601 DOUGLAS AVE. KALAMAZOO, MICH.

SEE US AT BOOTH 675 ASTE SHOW, MARCH 19-23, CHICAGO

Check AND ✓ Compare

the features of
NEW LUSTER-ON
ALUMINUM SEALER
with the process
you are now using

Luster-on®
ALUMINUM SEALER

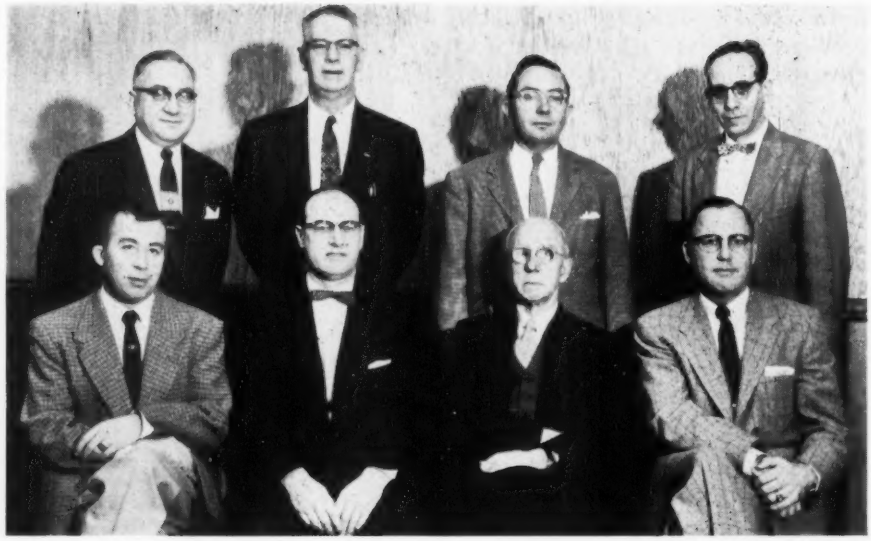
- ✓ produces a chromate film on aluminum that provides excellent corrosion protection and serves as an ideal paint base
- ✓ is an excellent substitute for anodizing in many applications where hardness is not a prime factor — gives better corrosion protection than anodizing.
- ✓ is easily applied at room temperature by dipping, spraying or brushing — treatment time extremely short.
- ✓ can be furnished in clear, yellow and dyed color finishes
- ✓ gives salt spray resistance to 600 hours
- ✓ adheres well, does not leach easily
- ✓ offers extreme economy of use
- ✓ meets government specifications MILC-5541

See for yourself the superior results obtained with new Luster-On Aluminum Sealer.

Send sample for free laboratory treatment.

THE *Chemical* CORPORATION

58 Waltham Avenue, Springfield, Mass.



Back Row, Left to Right: A. A. DiPaola, Sales Mgr.; E. Davenport, Canadian Mgr.; H. Olson, Plant Mgr. and John Lenzinger, Technical Director. Front Row, Left to Right: D. Johns, Comptroller; R. F. Neilson, General Mgr.; H. R. Neilson, Founder and H. F. Neilson, Director of Sales.

Cal. At present, overall company operations include two plants in Detroit, Mich.; a plant in Windsor, Ont.; in Los Angeles, Cal.; and a warehouse in Allentown, Pa. Warehouse facilities are also located in Charlotte, N. C.; Birmingham, Ala.; and Atlanta, Ga. In addition, many of the company's products are now manufactured abroad, or are otherwise available abroad in Sweden, Switzerland, Portugal, Union of South Africa, New Zealand, Australia, Mexico and other countries.

Still active in the company is *Raymond H. Neilson*, the founder; *Raymond F. Neilson*, general operations manager and *Howard F. Neilson*, director of sales. There are also a number of key personnel who have been with the company for over 20 years, including *E. Davenport*, manager of the Neilson Chemical Company of Canada, *A. A. DiPaola*, sales manager Detroit operations, *Jack Gray*, district representative in Toronto, and *H. Oleson*, general superintendent of Detroit plants.

Wyandotte Chemicals Holds 57th Annual District Sales Managers Conference

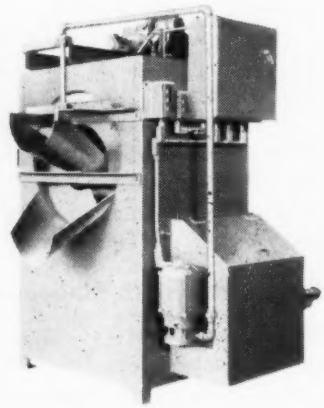
Wyandotte Chemicals, J. B. Ford Division, district sales managers conference, St. Clair Inn January 9-13, 1956.

Seated, left to right: *Donald E. An-*

Now..Wash Small Parts
in Bulk—*Faster and at Less Cost!*
New A-F Small Parts Batch Washer

- HIGH PRODUCTION IN SMALL SPACE
- ONE-MAN OPERATED

Parts batches are introduced through upper chute . . . automatically discharged from lower chute—clean as whistle and flash-dried. High-pressure fan-shaped spray nozzles and gentle helical spiral tumbling assure quick, low-cost cleaning.



Write for details and prices—today!

A-F

A-F *ENGINEERED* Cleaning and Finishing Machines
Plant-Wide Conveying Systems
Pre-Engineered Conveyors—Rollers, Wheel, Belt, Trolley

THE ALVEY-FERGUSON CO., 501 Disney St., CINCINNATI 9, OHIO and Azusa, California

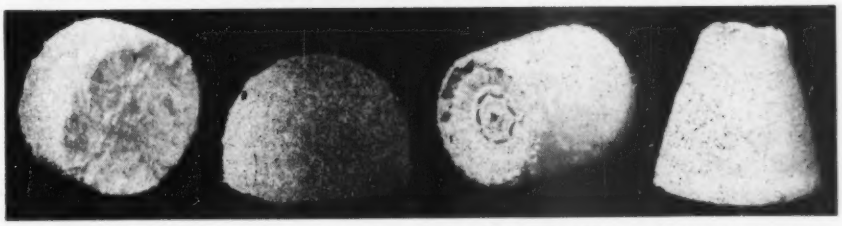
derson, director technical service; *M. E. Powers*, manager government sales: *Carl B. Dover*, Minneapolis; *A. J. Bettleheim*, New York; *Ford Ballantyne, Jr.*, vice-president of Wyandotte Chemicals Corp. and general manager of J. B. Ford Division; *Fred Tholen*, sales manager; *Gail Eldridge*, Kansas City; *Tom Jones*, Atlanta; *P. S. Spencer*, San Francisco; *James L. Ramsey*, manager railroad sales.

Standing, James S. Hubbard, Boston; *Fred King*, manager specialized cleaning products department; *C. J. Martin*, Buffalo; *David Leaverton*, sales operating assistant; *Earl F. Soop*, manager market research department: *W. C. Van Keuren*, Philadelphia; *Terence Neill*, Montreal; *George P. Bailey*, manager laundry product sales; *Tom McCormick*, Detroit; *William Cornwell*, manager dairy farm sales; *Tom Todd*, Los Angeles; *L. A. Wagner*, Seattle; *Howard Hastedt*, Chicago;; *Walter Hefti*, manager food processing sales; *C. E. Smith*, administrative assistant to Mr. Ballantyne, Jr.; *Fred Troxell*, Cleveland; *Robert Raine*, manager advertising and sales promotion department; *M. L. Lloyd*, Dallas; *Robert Racine*, manager industrial sales; *Stanley Johns*, St. Louis; *P. N. Burkard*, manager industrial railroad and aircraft department.

J. P. Smith Named General Manager Pfizer's Chemical Sales Division

J. Philip Smith, assistant to the senior vice-president of *Chas. Pfizer & Co., Inc.*, has been promoted to the position of general manager of the company's Chemical Sales Division.

BUFFS FOR INSIDE POLISHING



GOBLET BUFFS, TAPER BUFFS, CYLINDER BUFFS, SMALL POLISHING WHEELS, RAZOR EDGE BUFFS, and many others for deburring, polishing and grinding any internal contour.

Write for additional information or contact your local dealer. These buffs are stocked by many dealers throughout the country.

We manufacture a COMPLETE LINE OF BUFFS including full disc loose and sewed buffs and polishing wheels. Our metal center BIAS TYPE BUFF may help cut your polishing costs.

Your request on your letterhead will bring our complete catalog by return mail.

BARKER BROTHERS INC.

ESTABLISHED 1911

1660 Summerfield Street Brooklyn 27, N. Y.

Canadian Distributor — LEA PRODUCTS COMPANY, Montreal

Du-Lite

a proven BLACK FINISH for STAINLESS STEEL

LOW TEMPERATURE

Du-Lite 3-0 blackening bath can be operated at 240°F or less, much lower than other processes require for blackening stainless.

NON-DAMAGING

Low-temperature 3-0 process colors without surface damage, virtually eliminates costly spoilage of finished parts.

ECONOMICAL

3-0 bath is stable throughout its long life, requires only replacement of normal dragout.

EASY, SAFE OPERATION

Du-Lite 3-0 requires no carboys, special equipment, or unusual safety precaution. Ordinary cleaning rinses, low operating temperatures and cold water final rinse eliminate processing dangers.

GUARANTEED

Du-Lite 3-0 is made and guaranteed by Du-Lite, the metal finishing specialists. Depend on Du-Lite for all your cleaning and finishing problems.

DU-LITE CHEMICAL CORP.
MIDDLETOWN, CONN.

Send more information on Du-Lite 3-0 ..... ☐
Send information on metal finishing products.. ☐
Have your representative call..... ☐

Name.....
Company.....
Address.....
City..... Zone..... State.....

Du-Lite
METAL FINISHING SPECIALISTS

Mr. Smith joined the firm in 1933, working in the citric acid department. Five years later he was named a foreman in this department.

A graduate of St. John's University School of Law in 1943, Mr. Smith subsequently transferred to the company's legal division. He undertook varied assignments in legal work, including a two-year stay in Washington, D. C. as the company representative in the nation's capitol. In March, 1954 he stepped up to the post of assistant to the senior vice-president.

Infilco's Preston Pew Retires George Paulette Succeeds Him

After thirty-one years of service with *Infilco, Inc., Preston Pew* has retired from full time activity with the company.

During his long association with the firm, Mr. Pew has, at various times, been purchasing agent, factory manager, and most recently manager of the municipal sales division of the company. He is one of the senior members of the American Water Works Association and present president of the Arizona Sewage and Water Works Association. Mr. Pew will continue as a consultant with the company upon a part time basis.

George W. Paulette succeeds Mr. Pew as manager of the municipal sales division. He has had 24 years experience with the company as a district and field engineer with headquarters in Kansas City, New Orleans, Cleveland and Orlando. Mr. Paulette has taken up his duties at the home office of the company at Tucson, Ariz.

George Paulette

Diversey Forms New Subsidiary

For the second time in recent weeks, *The Diversey Corporation*, Chicago manufacturer of industrial sanitation chemicals, has announced the formation of a new foreign sales and manufacturing subsidiary. The new company, *Diversey-France*, has begun operations from its main office in Paris and will use the manufacturing facilities of other French chemical companies until its own plant is completed. Technical and sales personnel have been sent to France to begin training personnel in the manufacture and sale of Diversey products.

M. B. Diggin Named Vice-President and Director by H-VW-M

Hanson-Van Winkle-Munning Co., Matawan, N. J., announces the appointment of *Myron B. Diggin* as vice-president and director. Mr. Diggin has been with the firm for 25 years, its technical director for the past nine years, and was made an assistant vice-president in 1954.

He joined the company as a chemist, and was appointed chief chemist in 1933. His work has resulted in a number of developments and patents, particularly in the depositing of cadmium, zinc and lead; in rack coatings, anode diaphragms, and regenerative plating systems.

He was graduated from Wesleyan University with a B.S. in chemistry

Myron B. Diggin

in 1926, and was awarded an M.A. degree from the same university two years later. He taught chemistry at Wesleyan, established a consulting chemical laboratory, and later joined the technical staff of a chemical manufacturer.

A lecturer and author of numerous technical articles, Diggin is a member of The Electrochemical Society, American Chemical Society, American Ordnance Association, American Electroplaters' Society, American Society for Testing Materials, Institute of Metal Finishing, American Institute of Chemists, and recently served on the Research Committee of the American Electroplaters' Society. In 1946 he was awarded the A.E.S. gold medal.

Metal & Thermit - United Chromium to Expand Canadian Operations

Metal & Thermit Corp., New York, and *United Chromium of Canada, Ltd.*, Toronto, will combine Canadian activities under the name of *Metal & Thermit-United Chromium of Canada, Ltd.* Plans were also disclosed to construct new office, warehouse and plant facilities in Toronto to house the joint operation.

United Chromium of Canada has maintained a resident organization in Canada since 1946 with offices and limited manufacturing facilities at 15 Emily St., Toronto. Since the present quarters will be inadequate to house the expanded activities, the company is purchasing property in the Northwest section of Toronto where, on a four-acre tract, it will erect a modern building containing offices, warehouse space and manufacturing facilities. In addition to the United Chromium products which are already being made in Canada, these new and larger facilities will make it possible to manufacture in Canada some of the company's welding products, a number of its industrial chemicals and certain other products which in the past have been made in the United States.

The new company will be under the local management of *James Guffie*, who has been manager of United Chromium of Canada.

Other officers of Metal & Thermit-United Chromium of Canada, Limited are: *H. E. Martin*, president; *C. J. Beasley*, vice-president and treasurer; *H. D. McLeese*, vice-president; *E. F. Hutt*, office manager and *J. F. Condon*, secretary.

You'll lift more than you can pull with a metal cleaner, too—if you can get your cleaner under the soil. That's the way you'll clean with . . .

Cowles NEW QC WASHING MACHINE CLEANER

Cowles QC Cleaner gets under the soil—even where pressure spray jets won't reach—wets the soil thoroughly—pries it loose—disperses and emulsifies loosened soil.

All this in one quick trip through your washer
WITHOUT OBJECTIONABLE FOAMING

Get the complete story on this brand new Cowles QC Washing Machine CLEANER

SEND THIS COUPON—GET THIS TECHNICAL BULLETIN

Cowles Chemical Company
7014 Euclid Avenue • Cleveland 3, Ohio
Send Technical Bulletin on Cowles QC Washing Machine Cleaner.
Name_____
Company_____
Address_____
City_____ State_____

Cowles CHEMICAL COMPANY
CLEVELAND 3, OHIO

See Cowles Advertisements on pages 87 and 95

LaBounty V.P. of Bee Chemical

Thomas J. LaBounty has been elected as vice-president of *Bee Chemical Company* and its wholly owned subsidiary, *Logo, Inc.* His major responsibilities will be customer relations, sales, advertising, and market analysis.

Northwest Chemical Expands

Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich., has just completed a major expansion of its home office and plant facilities. The increased space more than doubles the laboratory and research departments, a move necessitated by the company's greatly increased activity in special research for firms seeking

custom solutions to their metal cleaning problems.

In addition, the warehouse section has been substantially enlarged and covered loading facilities for all-weather service have been constructed. A completely new second floor affords modern business office accommodations of more than double the old space.

Organized in 1932, Northwest Chemical Co. is today one of the foremost manufacturers of specialized metal cleaning chemicals in the country. Its products are available nationally through an organization of sales offices and distributors.

Infilco Forms Australian Subsidiary

Infilco, Inc., announces the formation of an Australian subsidiary with offices in Sydney. This becomes the firm's third foreign subsidiary, the other two being located in Mexico and Canada. A fourth subsidiary is in process of formation in Japan.

Stanley D. Heden has moved his family to Sydney to assist in the organization of the new subsidiary and to supervise its operation. Mr. Heden is a chemical engineer who has been associated with the company for 7 years. He has had varied experience in numerous departments and is well qualified for his foreign assignment. Under present plans Mr. Heden will remain in Australia for approximately 18 months at which time he will return to Tucson and will be replaced by *Peter Squires*, an Australian engineer who is currently in Tucson for indoctrination in the firm's equipment and processes.

Diamond Alkali Promotes Sales Executives

Two veteran sales executives of *Diamond Alkali Co.*, Cleveland, Ohio, took over important new managerial responsibilities on February 1, in the firm's recently-formed Electro Chemicals Division. The men promoted are *Clayton M. Holt*, manager of chlorine sales since October, 1941, who becomes manager of chlorine and hydrogen sales; and William L. McFadden, special staff assistant in the sales department for the past year and a half.

FILTER with a Sethco

New, Exclusive Self-Priming FILTER PUMP

300 GALS. PER HOUR

Model LSIN-20 portable, 65 lbs. 14" x 16" x 24"

SERVICE — Filters any acid or alkaline plating solution from ph 0 to ph 14. Removes particles down to 1 micron.

DESIGN: Filter Assembly as illustrated in H.T. Lucite (also available in Stainless Steel 316, Haveg, Epoxy Resin, Rigid Vinyl, Saran, Polyethylene, Teflon). Filter Tubes of cotton, dynel, porous stone or porous carbon. PUMP: Self-priming, Stainless Steel 316 (also available in an all plastic construction). Available as Centrifugal in Stainless Steel or Hasteloy. Motor is ¼ H.P., totally enclosed Ball Bearing. HOSE: acid and alkaline resistant. Base Platform: linen-impregnated phenolic laminate on rubber tire, ball bearing casters.

25 Stock Models to fit your needs. 50 to 2,400 gal./hr. cap. Others to your specifications.

JUST OFF THE PRESS—write for illustrated fact-folder on the complete line of filters by Sethco.

Sethco Mfg. Co. 74 WILLOUGHBY STREET BKLYN. 1, N. Y. • ULster 5-8940

who takes over the post of manager of caustic soda sales. In their newly-created posts, both men will continue to maintain their headquarters at the company's general offices in Cleveland.

Holt comes to his new assignment with 30 years' sales experience. He joined the technical staff of the firm's Painesville plant in 1933. He was transferred to the general offices (then in Pittsburgh) in 1938, becoming a member of the sales staff. Three years later, he was appointed chlorine sales manager.

McFadden is also a veteran Diamond employee. Following graduation from Drexel Institute of Technology in 1938 with a B. S. degree in chemical engineering, he joined the company as a laboratory technician.

Called to military service with the U. S. Army in 1944, he returned in 1946 as a chemist on the sales technical staff, advancing to sales and service representative in 1949 and to special staff assistant in 1954.

Dean Appoints Two Representatives

The Thermo-Panel Div. of *Dean Products, Inc.*, manufacturer of plate-coils announces the appointment of the *Barrett-Christie Co.*, 118 N. Clinton St., Chicago, Ill.—*Richard Lee*—to cover the northern part of Illinois and the northern part of Indiana.

Hornbruch to Represent Metalwash

Metalwash Machinery Corp. of Elizabeth, N. J. announces the appointment of *W. Dolph Hornbruch* to represent the company in the Eastern Area of New York State. The territory includes New York State east of Utica, and north of Poughkeepsie.

W. Dolph Hornbruch

Mr. Hornbruch is a graduate of Stevens Institute of Technology and has a diversified sales engineering background including aircraft instruments, electronics, heat treating, and finishing systems.

Enthone Changes Product Designations

Enthone, Inc., New Haven, Conn., announces a change in name only of their acid activating compound Actane (trademark registered). In view of their addition to this line of acid activators for various uses, namely, Actane 70, it has been decided that the use of a suffix number to designate the original product will eliminate confusion for those customers who might be using both products. There has been no change in the formulation or manufacture of Actane 22 (formerly called Actane).

Personnel Changes Announced by The Seymour Mfg. Co.

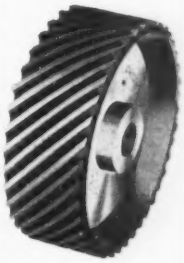
Five managerial personnel changes have been announced by *The Seymour Mfg. Co.* The changes are effective immediately.

Alexander P. Raeburn has been promoted to treasurer and will act as senior officer in charge of all financial and controller functions. *John D. Berwick, Jr.*, has been appointed general superintendent in charge of the manu-

Thoroughly Dependable...

PROVED BEST!

The R54 contact wheel has proved again and again in shops all over the country and abroad that our original claim "cuts cost like magic" is really doing just that. It cuts better, faster, longer and increases abrasive belt life—for substantial savings. And equally important—better quality work. Write for descriptive literature.

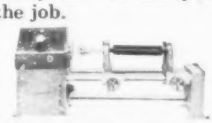


This precision machined and accurately balanced wheel is easily and quickly knocked down and reassembled for economical tire replacement or change.

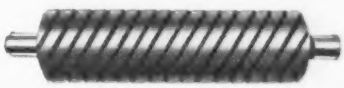
You replace only the tire when necessary and not the entire wheel. Choose from a complete assortment of treads in a wide variety of Durometers to best suit your grinding or polishing requirements. Our engineers will gladly make specific recommendations.

DYNAMICALLY BALANCED

All Chicago Rubber wheels are assured perfect dynamic balance for safety and efficiency on the job.



Gisholt Dynetric Balancing machine—used in balancing all Chicago Rubber rolls.



RUBBER ROLLERS FOR EVERY JOB

Rollers for every specific job—for steel, tin plate, paper and textile mills and all operations where high quality rubber rollers are used. Dynamically balanced, available in a wide variety of Durometers. These rolls are made in various diameters and serrations to suit any polishing requirements.

CHICAGO RUBBER COMPANY, INC.

2620 N. CLYBOURN AVE. • CHICAGO 14, ILL.

DEPT. MF2620

tacturing division and *Stephen J. Zelle* has been named chief engineer in charge of the engineering and maintenance division.

In sales, *Adolph W. Grele* has become director of sales of all products except phosphor bronze which will be headed by *Howard W. Thrasher*. Both men will report to *Robert M. Terry*, president.

H-VW-M Appoints Roney Assistant Sales Manager

David M. Roney, Jr., has been appointed assistant sales manager of *Hanson-Van Winkle-Munning Co.* Prior to this appointment, Roney was an administrative assistant with the company, concerned with all phases of sales management. He joined the firm last year.

Roney graduated from the U. S. Naval Academy with a BS degree. He then served with the U. S. Navy for nearly five years. After this service he attended the University of Pennsylvania Law School for one year.

Roney was then associated with the Scintilla Division of Bendix Aviation Corp., serving for almost two years as sales engineer in New York State and Michigan. In 1951 he joined Westinghouse Electric Corp. at East Pittsburgh, Pa., where he became application engineering manager in the Electroplating Projects Department.

David M. Roney, Jr.

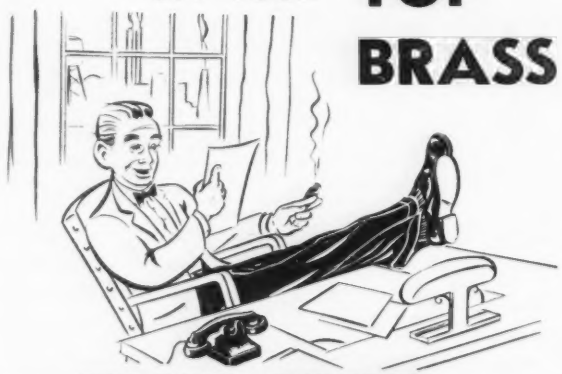
In his new appointment, Roney will concentrate his activity on the overall management, coordination and advancement of the full-automatic conveyor program, excluding strip and wire lines. He will also continue supervision of the overall direction and management of the plating barrel program.

Stokes Establishes Canadian Subsidiary

F. J. Stokes Co. of Canada, Ltd., has been established as a subsidiary of *F. J. Stokes Machine Co.*, Philadelphia, Pa., to carry on the steadily growing operations in Canada of the parent organization.

Francis Dougherty, Jr., president of the American company, will also head the new Canadian subsidiary. Its other officers will be *Francis J. Stokes, Jr.*, and *Allan A. Hutchings*, vice-presidents; *David E. Stokes*, secretary; and *Erwin R. Scott*, controller — all of whom hold corresponding positions in the parent company. *J. William Robinson*, a native Canadian who has been manager of the firm's Canadian sales office in Montreal since it was opened in April, 1953, will continue in charge of all Canadian operations under the new company. Headquarters of the company are now located at 27 Wellington St. East, Toronto.

TAKE THE LOAD OFF YOUR TOP BRASS



USE TRUE BRITE BRASS SOLUTIONS

Trouble Free — Low Cost
Little Supervision Needed
Ready To Use — Just Add Water
Uniform Color — Can Match Colors

Write For Bulletin on Brass Plating

TRUE BRITE CHEMICAL PRODUCTS CO.
BOX 31, OAKVILLE, CONN.

★ BUFFING NU SPRA GLU
Liquid buffing compound
since 1945

★ NUGLU
Cold flexible glue
since 1937

★ BRUSHING NUGLU
Grain and Nuglu mixture
since 1941

★ SPRAY BUFFING EQUIPMENT
Guns, pumps, and valves
since 1945

J. J. Siefen CO.
5643 LAUDERDALE · DETROIT 9, MICH.

Associations and Societies

AMERICAN ELECTROPLATERS' SOCIETY

AES Annual Convention

The Baltimore-Washington Branch announces the following programs for the Ladies and Children:

Ladies' Program

June 17 (Sunday)
Evening: Get-Together Party for early arrivals.
June 18 (Monday)
Morning: Opening convention session.
Noon: Luncheon (tentative)
Afternoon: Sightseeing Tour
Evening: International Fellowship Club Open House.
June 19 (Tuesday)
Noon: Aunt Ella Luncheon.
June 20 (Wednesday)
Afternoon: Outing to Mt. Vernon; out by bus, returning by boat
Evening: Floor Show and Dance.
June 21 (Thursday)
Noon: Luncheon
Afternoon: Plato Party
Evening: Banquet and Dance.

Children's Program (Age 7 to 14)

Providing at least 40 young folks register for it—registration fee $10—a program including events especially for them will be held for the first time at this convention. The following features are to be included except that attending the banquet will entail an additional charge of $6.

June 17 (Sunday)
Evening: Get-Ttogether Party
June 18 (Monday)
Noon: Luncheon
Afternoon: Sightseeing Trip
Evening: International Fellowship Club Open House.
June 19 (Tuesday)
All-day trip touring the Washington National Airport, including airlines maintenance facilities.
June 20 (Wednesday)
Afternoon: Outing to Mt. Vernon
Evening: Floor Show and Dance.
June 21 (Thursday)
All-day trip to Washington Zoo (National Zoological Park) and/or Federal Bureau of Investigation
Evening: Banquet and Dance.

Pittsburgh Branch

The *Pittsburgh Branch* of the *American Electroplaters' Society* will hold its annual "*Ladies Night Dinner and Dance*" on April 21 at the Gateway Plaza. In the past, this affair has received the fullest support from the many metal finishers and suppliers to the metal finishing industry in the Pittsburgh area. It is our sincere hope that this fine cooperation will again prevail "Ladies Night" an outstanding success.

The "Ladies Night" social event committee has made arrangements for the best of accommodations for this affair. There will be a fine steak dinner, dancing to *Baron Elliott's Orchestra*, door prizes, and favors for the women. Ample bar facilities and free parking have also been arranged.

Tickets for this affair can be purchased from *Joseph R. Kristofik*, Westinghouse Electric Corporation, Electroplating Projects Department 6-L-13, East Pittsburgh, Pennsylvania. It is requested that all orders for tickets be

Rhodium
ELECTROPLATING SOLUTIONS
White, hard and highly resistant to corrosion, Rhodium Electroplate is a precious metal, available at relatively moderate cost. Its characteristics make it advantageous for use in the manufacture of Jewelry, Giftwares, Accessories and many other applications. Consult us about your specific plating problems.
SINCE 1901
SIGMUND COHN MFG. CO., INC.
121 SOUTH COLUMBUS AVENUE · MOUNT VERNON, NEW YORK

submitted prior to April 1.

Myron Ceresa
Co-Chairman
Social Event Committee

Newark Branch

The 1956 course in Basic Practical Electroplating sponsored by the *Newark Branch* of the *American Electroplaters' Society* consists of eleven weekly sessions on successive Tuesday evenings began on February 28th and ends on May 8, 1956.

Five sessions will be devoted to preparation of the basis metal for plating, four sessions will cover various common plating processes, and two sessions will deal with maintenance and control of plating solutions. The instructors will be, for the most part, members of the Newark Branch who were selected on the basis of their specialization in particular phases of electroplating. The meetings will be held at various industrial plants and laboratories in the Newark area so as to combine plant tours with the lectures.

The schedule for the balance of the course is as follows:

March 13, 1956

Metal Finish, Inc.
Newark, N. J.
Subject: Barrel Finishing
Instructor: P. E. Kirchartz

March 20, 1956

Behr-Manning Co., Inc.
Teterboro, N. J.
Subject: Belt Polishing
Instructor: E. E. Oathout

March 27, 1956

Oakite Products, Inc. (Labs.)
New York, N. Y.
Subject: Electrocleaning and Phosphate Coatings
Instructor: G. A. Lux

April 3, 1956

Royal Plating and Polishing Co.
Newark, N. J.
Subject: Copper and Dull Nickel Plating
Instructor: L. J. Donroe

April 10, 1956

Pyrene Metal Finishers, Inc.
Newark, N. J.
Subject: Bright Nickel and Chromium Plating
Instructor: L. J. Donroe

April 17, 1956

Hanson-Van Winkle-Munning Co.
Matawan, N. J.
Subject: Analysis and Control of Plating Solutions
Instructor: D. G. Foulke

April 24, 1956

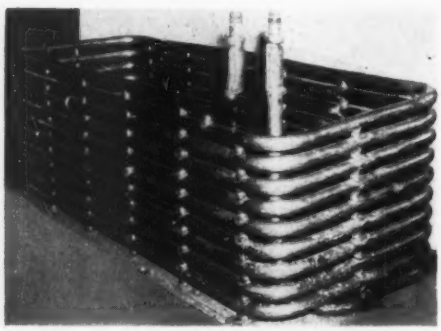
Sel-Rex Precious Metals, Inc.
Belleville, N. J.
Subject: Precious Metal Plating and Solution Analysis
Instructor: A. Korbelak

May 1, 1956

Bart-Messing Corp.
Newark, N. J.
Subject: Purification and Filtration of Plating Solutions
Instructors: D. S. Carr and A. G. Buschow

May 8, 1956

Kosmos Electrofinishing Research, Inc.
Belleville, N. J.
Subject: Cadmium and Zinc Plating
Instructor: J. Kosmos



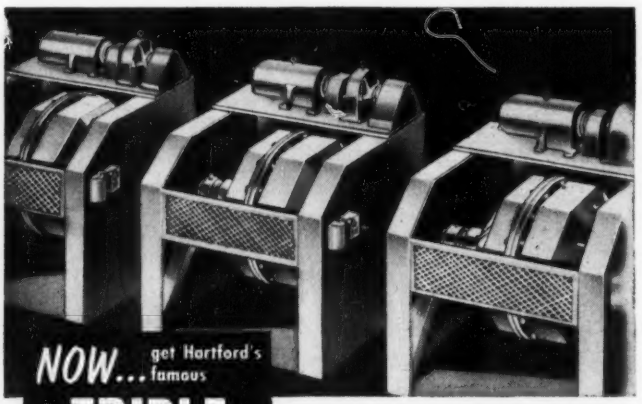
Bonus values in lead work

Whether it is coils, casings or pots, tanks or tray linings, or other special lead fabrications, the Storts lead welding specification sets up bonus values in long life utility. Storts lead work is famous throughout the Northeast for high quality and complete dependability. We should be glad to assist you in designing your lead work, and to quote on your large or small requirements.

STORTS WELDING COMPANY INCORPORATED

38 Stone Street
MERIDEN, CONN.

Manufacturers of Welded Fabrications to Specification



NOW... get Hartford's famous
TRIPLE ACTION
in
fully enclosed
cutting barrels

There's a new look in Hartford's Tumbling Barrels... but underneath you get the famous Triple Action Barrel originated by Hartford and unsurpassed for doing a better job ...faster...at lower cost.

Compare these advantages! The Hartford fully enclosed Model 1956 is extremely compact . . . requires less floor space than most enclosed barrels. With Hartford the power unit is on top, where it belongs for long life, cleanliness and ease of maintenance. Barrel is mounted on rugged "A" frame for maximum strength. Streamlined steel enclosure confines splash and contributes to safe operation. Pivoted front guard opens to permit quick, easy loading and unloading . . . plus easy removal of barrel assembly. Standard power unit has four speed gear shift transmission. Literature and prices promptly furnished.

Hartford
PRECISION BALLS • RETAINERS
BEARINGS • TUMBLING BARRELS

The Hartford Steel Ball Co., Inc., 13 Jefferson Ave., W. Hartford 6, Conn.

Boston Branch

The *Boston Branch* of the *American Electroplaters' Society* will hold its Twentieth Annual Technical Session and Banquet at the Hotel Statler, Boston, Mass. on May 5, 1956.

Myer Shapiro of *Gillette Safety Razor Co.*, who is the Boston Branch Librarian, has planned a symposium on purification with the following speakers:

W. A. Helbig of the *Atlas Powder Co.*, Darco Div., will speak on "Purification of Electroplating Solutions with Activated Carbon."

B. C. Case of *Sunbeam Corp.*, will speak on "Electrolytic Purification."

Al Korbelak of *Bart-Messing Co.*, will speak on "Filtration of Plating Solutions."

While the Technical Session is in progress, *Ann Baker Love* will entertain the ladies at one of the local theaters. The name of the show cannot be determined as of this time, but in the past they have seen such shows as Pajama Game, Damn Yankees, etc.

The chairman of the affair is *John Wright* of *F. M. Callahan & Son*, Malden, Mass., who was appointed to his office by *Dr. Harold A. Narcus* of *Electrochemical Industries*, Worcester, Mass., president of the Boston Branch. *Dr. George B. Swift*, past president of the A.E.S., is secretary of the Boston Branch.

The Banquet in the evening will feature the Hotel Statler's famous roast beef dinner and there will also be dancing and door prizes.

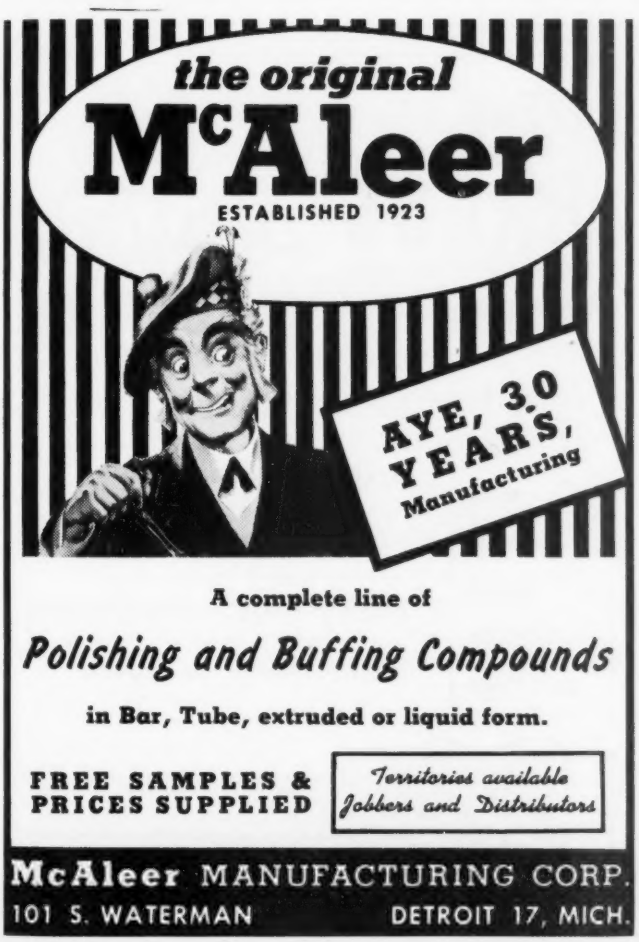
Indianapolis Branch

Thirty members of the branch attended the January 4th, 1956 meeting at Fox Steak House. Among the guests was *Mr. Barkley* of the Kansas City Branch. After the usual opening of introductions, reports of secretary and treasurer, the delegates for the year were elected. In a motion by *Harry Smith* and seconded by *Bert Hawhee*, the branch secretary was made a delegate. Others elected were *John Holland* and *John Hood*. Alternates elected were *Quentin Shockley*, *Ed Bruck* and *Bert Hawhee*. President *Herb Kennedy* presented the By-laws of the Tri-State Region A.E.S. and there were several changes to be accepted by the branch.

Reports were given on the annual yearly meeting of April 28th. *Lowell Fisher* is in charge of hotel reservations and rooms. *Leo Reynolds* is in charge of tickets and they will be on sale the last of February. The next tri-State meeting was announced and this will be on March 10th at Biltmore Hotel at Dayton, Ohio.

One transfer of membership was accepted, for *David Sivertsen*, from the Newark Branch. Ed Bruck was appointed branch historian to write up a complete history of the branch and send it to the Newark office by April 1st.

People who have been reading "Outdoors In Indiana" in the Indianapolis newspapers for many years had the pleasure of seeing and hearing *William Toms* in person at this meeting. Mr. Toms was a combination humorist and conservationist. His subject was stream pollution and how it affects wildlife in Indiana. He cited many instances of various types of pollution, not only from plating installations but from canning factories, paper mills, and those who use cyanide in treatment of metal. Human error is the cause of the many known times that state streams have been polluted. Mr. Toms



A complete line of

Polishing and Buffing Compounds

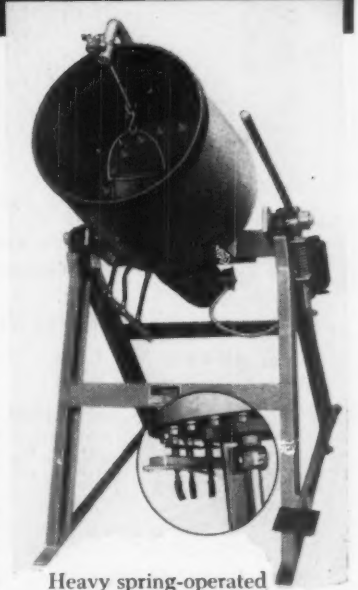
in Bar, Tube, extruded or liquid form.

FREE SAMPLES & PRICES SUPPLIED

Territories available Jobbers and Distributors

McAleer MANUFACTURING CORP.
101 S. WATERMAN DETROIT 17, MICH.

Large Oblique Plater
for quantity production of small, hard-to-hold articles



No perforations—plates, needles, springs and small wire parts that catch in or slip through perforations in horizontal plating barrels.

Large barrel, 23" dia. by 23" deep; capacity, about 2 pecks. Made of heavy sheet steel lined with ¼" thick vulcanized rubber.

Tilting lever and foot-operated lock simplify loading, unloading and removal of solution.

Chrome plated button contacts bring current through bottom. Only contacts in the work carry current.

Anode basket to use scrap anodes. Saves time—avoids waste.

Send for literature or ask BELKE Service Engineer.

Heavy spring-operated contactors conduct current only to contacts in work.

Belke MFG. CO., 947 N. Cicero Ave., Chicago 51, Ill.
EVERYTHING FOR PLATING PLANTS

is a crusader in this field and is very sincere in his efforts. He concluded his talk with a serious moment when he stated that he honestly believed the whole thing will be straightened up in our state and elsewhere. The meeting adjourned at 9:30 P.M.

Edna Rohrabaugh
Secretary

St. Joseph Valley Branch

Ralph D. Wysong, past president of the *St. Joseph Valley Branch*, after working his way up through all the offices, is a candidate for National Third Vice-President of the *American Electroplaters' Society*. He has been a Branch delegate to all National Conventions since 1943, was a member of the Planning Committee for the 1952 convention, and chairman of one session at that convention.

A graduate of Purdue University, he is employed as a chemical engineer in charge of finishes at the Studebaker Div. of Studebaker-Packard Corp. He is a member of the *American Society for Metals, Automotive Manufacturers' Association, American Society for Testing Materials*, and the *Society of Automotive Engineers*. His non-technical activities include work in state and local conservation projects, the Boy Scouts, church and lodge.

Ralph D. Wysong

Mr. Wysong resides at 3511 Chevy Chase, South Bend, Ind.

New England Regional Meeting

The seventeenth annual New England Regional Meeting of the American Electroplaters' Society will be held on Saturday, April 7 at the Hotel Statler in Hartford Conn., with the New Haven branch acting as host. This year five branches will participate to make this regional meeting a five star affair, according to *William K. Murray*, general chairman.

Robert J. Girard, Springfield Branch, chairman of the educational program has announced the following program of speakers:—

1. "Barrel Burnishing" by *Arthur S. Kohler*, Frederick Gumm Chem. Co., Inc., Kearny, N. J.
2. "Textiles for Buffing" by *William Phillips*, Deering Milliken Co.
3. "High Speed Bright Plating of Brass, Copper and Nickel in Barrels" by *Barnet D. Ostrow*, Lea-Ronal, Inc., Jamaica, N. Y.

Concurrent with the educational session which will start at 2 P.M., there will be a special ladies' program consisting of entertainment and bingo games with prizes under the able direction of *Julie P. Madzik*, Hartford Branch.

After the educational session and ladies' program, there will be the usual dinner-dance starting at 6:30 P.M. in

BEAM-KNODEL CO.

Metropolitan Distributors

HANSON-VAN WINKLE-MUNNING CO.

Complete Service for Metal Finishing

Products Listed Below Available in New York Stock With Reasonable Exceptions

GENERATORS

Anodes, All Kinds	Tallow	Nickel Salts
Brushes	Rouge	Copper Salts
Buffs	Emery Paste	Cyanide
Chemicals	Cleaners	Tanks, All Kinds
Tripoli Comp.	Emery	Plating Barrels
Acme White Finish	Glue	Polishing Wheels
		Polishing Lathes

195 LAFAYETTE ST., COR. BROOME
Phone CAnal 6-3956-7 NEW YORK 12, N. Y.

FILTERS

MAIZO Drying Materials

LEA Buffing & Polishing PRODUCTS

NEW
BRASS *plating* ADDITIVE

—can be used with present brass plating solutions

- Faster Plating
- Brighter Finish
- No Cyanide Fumes
- Many *plus* Advantages

Information on request

JELCO FINISHING EQUIPMENT CORP.

153 East 26th Street, New York 10, N. Y.
LExington 2-3055

the Capitol Ballroom. *Joseph McInerney* of the Hartford Branch, has arranged an excellent entertainment program. Music will be supplied by William Glenny's orchestra as of last year.

Tickets for this five star regional may be obtained at $6.00 per person from the secretaries of any of the following five branches: Waterbury, New Haven, Bridgeport, Springfield or Hartford.

Pittsburgh Branch

The Pittsburgh Branch held its February meeting at the Avalon Room of the Sherwyn Hotel. The two free meals at the dinner preceding the meeting were won by *Bill Pizoli* and *Frank Mountain*.

At the short business meeting the nominating committee proposed the following slate for next year: President, *M. Ceresa;* 1st Vice-President, *Herb Schram;* 2nd Vice-President, *Jim Crain;* Treasurer, *Bill Pizoli;* Secretary, *F. Stevens;* Librarian, *Russ Reynolds;* and, to the Board of Managers, *Rudy Schindler*, delegates *Ed Smith*, *Bob Woofter* and *Leo Schmitt* and as alternate delegates, *Myron Ceresa*, *R. Schindler* and *Rex Goldbach*. *Ken Hittle* reported that Baron Elliott's orchestra had been selected for Ladies' Night, April 21st at Gateway Plaza.

The branch was sorry to learn of three key members, *Ed Washburn*, *Art Kaupe* and *Fred Dixon*, branch officers past or present, who are leaving due to job transfers or new positions.

Speaker for the evening was *Dr. Richard M. Wick* of Bethlehem Steel Co., who discussed a subject on which he is an outstanding authority "Continuous Electroplating of Strip and Wire."

During the break for refreshments the speaker drew the slip for the door prize winner. *Ed Sokalski* won a handy Casco steam iron presented by *Collin F. Stevens* of Frederic B. Stevens, Inc.

Herb Schram,
Secretary

Los Angeles Branch

A panel discussion on "Maintenance of Electrical Plating Equipment" featured the educational session of the February 8th meeting of Los Angeles Branch. The interesting and timely subject attracted an overflow crowd of 90 members and guests to the meeting in Rodger Young Cafe. The following gentlemen, each an authority in the field of plating shop power equipment, constituted the panel: *Norman Dieball*, Udylite Corp.; *Harold Smallman*, Hanson-Van Winkle-Munning Co.; *Robert Coombs*, Crown City Plating Co., Pasadena; and *Earl Sweinhart*, president, Sweinhart Electric Co., Los Angeles. *Mitchell Raskin*, plating foreman for Ajax Hardware Mfg. Co., served as moderator.

Each speaker was assigned a period in which to present a summary of his views on an assigned phase of electrical maintenance. Thereafter, the panelists became the targets for questions fired from the floor, either in written or oral form. The panel was kept busy till well beyond the usual 10.30 o'clock adjournment.

President *Earl W. Arnold* presided over the business session at which two new members were initiated and the applications of seven others approved. Among the applicants for reinstatement was *Ernice Garlis* of Plating, Inc., who was one of the 20 or so charter members who founded Los Angeles Branch in 1930.

McKeon's

Zinc-Brite

TRADE MARK REG'D.

Top-quality, low-cost

ZINC SOLUTION PURIFIER

Eliminates heavy metal impurities, including copper. Prevents harmful build-up of carbonates.

A complete cleansing treatment: — No other purification measures necessary.

WRITE - PHONE - WIRE COLLECT

Sulphur Products Co. Inc.

228 McKeon Way
Greensburg, Pa.

Be MODERN!

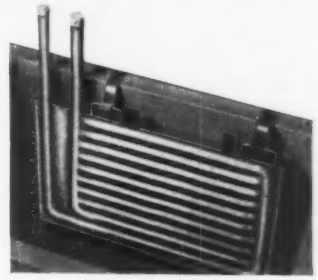
Use DEAN
THERMO-PANEL
COILS

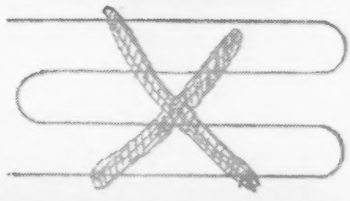
Cost less. Weigh less. Save space. More Economical.

DON'T USE
OLD
FASHIONED
PIPE COILS

Before specifying another pipe coil be sure that you know the advantages possessed by Dean THERMO-PANEL Coils.

Tell us your problem and our engineers will gladly help you. No obligation. For literature use return coupon below.





THERMO-PANEL
DIVISION
Dean Products, Inc., 613 Franklin Ave., Brooklyn 38, N. Y. STerling 9-5400

☐ Send Bulletin 355 — Technical Data.
☐ Send Bulletin 256 — Design and Price Information.

Name _____
Company _____
Street _____
City _____ Zone _____ State _____

Truman Stoner, chairman of the membership drive, called attention to the fact that the current drive will end with the March meeting. He reported that, thus far, the drive had brought in 17 new members. Prizes, in the form of merchandising certificates of graduated value, will be awarded at the March meeting.

Tony Stabile, research committee chairman, reported that Mefford Chemical Co. and L. H. Butcher Co. had joined the ranks of sustaining members, bringing the total to 19.

Stuart Krental, chairman of the nominating committee, submitted a list of candidates for branch offices to be voted upon at the March 14 meeting. The committee recommended:

For president, *L. Truman Stoner*, Chief Products Inc.; first vice-president, *George Magurean*, Convair, Inc., Pomona; 2nd vice-president, *Norman K. McEwan*, Virtue Bros.; secretary, *Frank Virgil*, L. H Butcher Co.; treasurer, *George Hetz*, Mefford Chemical Co.; Librarian, *Emmet Babcock*, Convair, Inc., Board of Managers—Chairman, *Earl W. Arnold*, L. H. Butcher Co.: *Harvey Hunt*, Alert Supply Co.; and *Tony Stabile*, Associated Plating Co.

The annual educational session and dinner dance of Los Angeles Branch is scheduled for March 17 at the Statler Hotel, West 7th and Figueroa Sts., Los Angeles. The program comprises a morning technical session, at which three speakers will be presented on subjects pertinent to the finishing industry at this time; a noon-day luncheon, high-lighted by the branch's traditional "Story Telling Contest"; and a dinner dance, at which special prizes will be available for each lady, and a multitude of door prizes for the group as a whole. Arrangements for accommodating 150 at the technical sessions, and 500 to 600 at the dinner dance have been made.

Baltimore-Washington Branch

The January meeting of the Baltimore-Washington Branch was called to order at 8:15 P.M. by president *Metzger* in the Marling House in Baltimore.

The first order of business was the adoption, by the branch, of a new procedure for the election of delegates and alternates to the national convention. *James C. Withers* was elected to membership in the branch. The speaker of the evening, *R. F. Hafer*, Reynolds Metals Co., Louisville, Ky., was then introduced by librarian *Edward C. Bertucio*. In delivering his talk, "Anodizing Aluminum," which he presented in a very thorough and comprehensive manner, Mr. Hafer discussed the three basic types of oxide films formed, the theory of electrolytic oxide film formation and how the alloy effects the appearance, structure, and properties of the film. He outlined the basic process procedures, gave a general process description and pointed out how the corrosion, abrasion and electrical resistance of aluminum can be decidedly changed by anodizing.

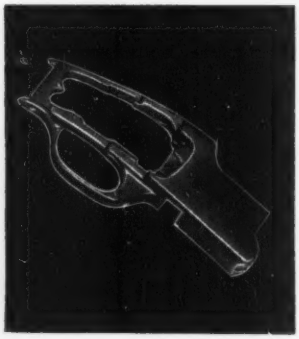
The length of the question and answer period which followed attested to the interest in his subject.

Carl H. Thiede
Secretary

Indianapolis Branch

Ladies and Guest Night was in order for the February 1st. 1956 meet-

CASE HISTORY



BETTER BLACKENING . . . PROFITS UP . . . WITH Swift BLACKENING COMPOUNDS

A famous manufacturer* was unable to blacken malleable iron. Swift blended a blackening compound that permitted a change from an expensive forging to a malleable iron casting. Blackening was complete—durable—inexpensive.

Whatever your product, or problem, Swift can deliver a blackening compound that gives rich, solid black durable finishes!

*name on request

GET FULL DETAILS NOW—send for catalog sheet and technical bulletins.

THE Swift INDUSTRIAL CHEMICAL COMPANY
Box 301 Canton, Connecticut

The New Magic Ingredient FOR BUFFING COMPOUNDS

TAMART

. . . the name of our new composite abrasive for hard buffing compounds used on non-ferrous metals . . . in laboratory tests and actual use TAMART has proven equal or superior to similar abrasives now in use . . . and of special interest to you, TAMART is far more economical.

DEVELOPED, PRODUCED AND SOLD BY THE MAKERS OF BUFFING COMPOSITION SILICAS

TAMMS INDUSTRIES, INC., DEPT. M, 228 N. LA SALLE ST., CHICAGO 1, ILL.

ing of the branch. One hundred ten persons attended at the Western Electric Co. plant in Indianapolis for dinner and tour. Regular business was dispensed with except for a few announcements which were the reminder of the Tri-State meeting on March 10th in Dayton and our own annual meeting of April 28th at the Indianapolis Athletic Club.

The group broke up into small numbers of six or eight and with a guide set out to see this huge plant, which employs about eight thousand persons, of which twenty-one hundred were on duty at the time of the tour.

Edna Rohrabaugh
Secretary

New York Branch

The meeting held January 13th, 1956 at the Hotel Statler was called to order by President *Al. Fusco*. The roll of officers was called and all were noted present. Applications were presented for membership into the Society by Messrs. *Fowler, Henring, Howes, Hotten, Proli, Pepe, Ader, Bevell, Wexler, Campanella, Corrona, Ruddey.*

Messrs *LeFevee, Maymont, Brooks* and *Capozzi* were accepted and duly sworn in as members of the branch.

There being no other business to be acted on Mr. Fusco turned the chair over to *Dr. E. Saubestre*, librarian, who in turn presented *M. Perez*, of the Coatings Department of United Chromium Div. Mr. Perez addressed the branch on "Rack Coatings and Stop-Offs."

The talk was well received by the 55 members present and a lively question period ensued. At the close of the meeting, *Art Pierdon* of Baltimore - Washington Branch discussed briefly the forthcoming Convention. *Ralph Schaefer*, past-president of the National Society was introduced to the members.

Lester Levinson

International Association of Electrotypers & Stereotypers

The International Association of Electrotypers & Stereotypers, Inc., has scheduled a Spring Conference and Exhibit to be held on:

Dates: April 25 and 26, 1956.
Place: Hotel New Yorker, New York City
Time: First Session, 2:00 P.M. to 5:30 P.M., Wednesday, April 25th, North Ball Room.
Second Session, 9:30 A.M. to 12:00 Noon, Thursday, April 26th, North Ball Room.
Luncheon, 12:30 P.M., Mosaic Room, Lower Lobby.
Third Session, 2:00 P.M. to adjournment, Thursday, April 26th, North Ball Room.

The Board of Directors will meet at 9:30 A.M. on Wednesday, April 25th, in the Club Lounge.

Masters' Electro-Plating Association

The 38th Annual Banquet and Entertainment of the *Masters' Electro-Plating Association, Inc.* of New York will be held on Saturday, May 12, 1956. The reception will be held in the Sert room at 6:30 P.M. and the Banquet and Entertainment at 8:30 P.M. in the Starlight Roof of the Waldorf-Astoria Hotel, New York City.

The Masters' Electro-Platers Association is one of the largest local Associations of Job-Platers in the U. S. and is affiliated with the National

THE MASTERS' ELECTRO-PLATING ASSOCIATION, INC.
of NEW YORK
59 EAST FOURTH STREET
NEW YORK 3, NEW YORK
is proud to announce its
38th Annual
Banquet and Entertainment
to be held
SATURDAY, MAY 12, 1956
in the
STARLIGHT ROOF of the WALDORF-ASTORIA
NEW YORK CITY

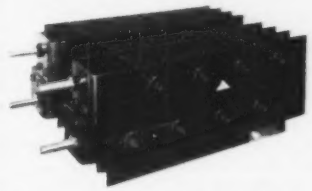
Reception & Cocktails 6:30 P.M.
Banquet 8:30 P.M.
Subscription - - - $25.00 per person

BUY Lektron® RECTIFIER
For the Finest in PLATING RECTIFIERS

A BETTER SOURCE OF DC POWER — MORE FOR YOUR MONEY

★ Operate from —40° to 225° F.
★ 50 to 50,000 Amperes DC
★ Built-in Voltage Regulator and Meters
★ Heavy Duty Transformers, Husky Fans

Two styles available—1. Selenium for cool zones, or 2. Magnesium copper sulphide for the hot, dirty jobs. Units still running after 4 years of constant duty.



Replacement Rectifier Stacks for Lektron or Udylite-Mallory

Magnesium copper sulphide rectifiers make your plating power supply more rugged and dependable. Magnesium radiator fins for fast heat dissipation and lighter weight. Matching pairs.

Model 4045—750 amps at 12 volts DC—1500 amps. at 6 volts D.C. Operates on 208, 220 or 440 A.C. Weight 525 lbs. F.O.B. Indianapolis, Indiana.

SOME JOBBERS AND SALES TERRITORIES OPEN

ELECTRONIC RECTIFIERS, INC.
2102 SPANN AVENUE INDIANAPOLIS 3, INDIANA

Association of Metal Finishers. In the Metropolitan area, the member-shops of the Masters' do almost 75% of all the contract finishing and they service some 5,000 metal fabricating firms. The officers are *Sal Novelli* of Service Plating Co., Chairman; *Jesse Goldman* of Grand Chromium Corp., Vice-Chairman; and *Frank Kaiser* of Long Island Mechanical Plating Co., Treasurer. Mr. Goldman is also Banquet Chairman and *S. C. Taormina* is the Executive Secretary.

A banquet journal will also be published in connection with the event. Banquet Tickets may be obtained from the Association Headquarters at 59 East 4 Street, New York City.

THE ULTRASONIC MANUFACTURERS ASSOCIATION

Formation of the *Ultrasonic Manufacturers' Association* was announced last month by its newly elected officers and board of directors. Formed by the leading manufacturers in this new and rapidly expanding field, the U.M.A. will promote dissemination of sound and accurate information about ultrasonic equipment and its applications. Existing ultrasonic equipment capabilities and future applications will be clearly represented to promote the growth of the industry on a firm and lasting basis. U.M.A. will assist the ultrasonic industry in adopting ethical practices in sales, publicity and advertising. In addition, it will aid its members to secure clear and realistic rulings from governmental agencies such as the Federal Communications Commission.

The officers of the Association are:

President: *W. C. Potthoff*, vice-pres., Aeroprojects, Inc.

Vice-President: *Stanley R. Rich*, tech. director and vice-president The General Ultrasonics Co.

Secretary: *Norman Branson*, president, Branson Instruments, Inc.

Treasurer: *Jack Welch*, general manager, Machine Tool Div. Sheffield Corp.

The board of directors include Messrs. Potthoff and Rich as directors, elected for two years, and Messrs. Branson and Welch for one year each. In addition, *Dorr Wagner* of Solar Mfg. Corp. was elected a director for two years, and *R. B. Manning* of Sperry Products and *Stanley E. Jacke* of Detrex Co. were elected directors for one year.

NACE

Complete arrangements for the technical program to be given during the 12th Annual Conference and Corrosion Show at Hotel Statler, New York have been announced. The March 12-16 meeting will have 14 symposia and numerous other events including meetings of 62 technical committees.

The Corrosion Show, held concurrently with the conference, will display the products and services of 86 companies in 117 booths.

Meetings of the NACE's standing committees will be held, and the annual general business meeting of the association is scheduled for Tuesday morning, March 13. At the annual banquet on Wednesday, March 14 presentation of the annual NACE Awards will be made to *Mars G. Fontana*, Ohio State University, Columbus and *Norman Hackerman*, University of Texas, Austin. *Edward L. Simons*, General Electric Research Laboratory, Schenectady, N. Y. will receive the 1955 NACE Junior author award.

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

CLAIR SURFACE FINISHING MACHINES

FINISH THE JOB PERFECTLY with CLAIR SURFACE FINISHING MACHINES

- ALL structural members engineered for greater strength!
- ALL long range vulnerable wear points incorporate replaceable hardened wear inserts!
- GREATLY advanced hydraulic, air and electrical components!
- MORE flexible adjustments for greater VERSATILITY
- V-BELT spindle drives; Automatic air float of buffing rolls at any predetermined uniform contact pressure over flat or contoured surfaces!
- 110-VOLT control circuits; auto-cycling; body pressure safety-bar control; automatic spray application of compounds!

Many highly specialized models to choose from

CLAIR MANUFACTURING COMPANY, Inc., OLEAN, N. Y.

Fulton Asphalt Co.

BUILDERS BUILDING • 165 W. WACKER DRIVE
CHICAGO 1, ILLINOIS

Ferrolite® Hot Mastic Floors

- in colors
- acid proof
- oil and grease proof
- load sustaining
- over 500 lbs. psi.

Industrial Floors

Asphalt Mastic Floors

Acid Proof Mastic Floors

Serving Industry Since 1870

Write for literature

LETTER TO THE EDITOR

Mr. Thomas Trumbour,
General Manager
METAL FINISHING
381 Broadway
Westwood, N. J.

Dear Sir:—

At this time I would like to congratulate you and your staff on the marvelous work you have done over the years on METAL FINISHING.

I have been a subscriber to your magazine for approximately 50 years. Over that period of time the knowledge that I gained helped me considerably to meet my everyday problems and further my practical knowledge.

In a few months I plan to retire from the Monroe Calculating Machine Company. During my retirement I plan to continue to work at metal finishing in my own shop.

This letter is being sent to you as an inspiration to young men who are starting out in the business to let them know how your magazine can help them during their active years in business, and they can still continue their work and make it a hobby should they plan to do so during their retirement.

Respectfully,
John Ludescher
Supervisor of Metal Finishing

News from California

By Fred A. Herr

A Southern California lawyer and an electrical engineer, who drifted into plating work more or less by chance in 1948, have just completed a $40,000 expansion program which provides them with a shop equipped to do practically any job of metal finishing from conventional cadmium and chromium work to plating on titanium.

Fred Kilmer (the engineer) and *Brice Kearsley* (the lawyer) were called in late in 1948 to help straighten out the tangled affairs of a hole-in-the-wall plating shop in West Los Angeles that was going nowhere fast. They wound up buying the plant. It had 2,000 sq. ft. of floor area and one chromium and one cadmium tank.

Early this year, Kilmer and Kearsley completed an expansion program at their Barry Avenue Plating Co., 2210 Barry Ave., West Los Angeles. The expansion included the erection of a new 5,000 sq. ft. building, the leasing of an adjacent 1,000 sq. ft. building, and the installation in the existing and acquired building of some $25,000 worth of new plating, polishing and buffing equipment.

Their total floor area in three structures is now 9,500 sq. ft. A completely new cadmium department has been installed in the smallest building with facilities for cadmium and chromating. While the shop is equipped with some barrels, this new department is geared mainly for still plating, chiefly on electronics parts.

The newly erected 5,000 sq. ft. building houses a new anodizing set-

Alert

BUFFING COMPOUNDS

MADE IN CALIFORNIA

And formulated specifically to meet local needs

•

PLATING EQUIPMENT & SUPPLIES

NORTHWEST METAL CLEANERS

NOT NECESSARILY THE CHEAPEST

BUT . . . *lowest cost per item cleaned*

This is One of the Outstanding Lines
We Represent Exclusively on the West Coast

•

CHECK WITH US FOR YOUR NEEDS

Alert SUPPLY COMPANY

4755 E. 49th STREET LOS ANGELES 58, CALIF.
Phone: LOgan 8-4781
SAN FRANCISCO SEATTLE

TAKE IT OFF!!

WITH **PHOENIX COLD STRIPPER**

Used Cold. Non-flammable.

Non-injurious.

For speedy removal of tough industrial paints, enamels, synthetics, lacquers, varnishes, wrinkles, dye markings, graphite, metal lithography, epoxies, and enamel wire stripping.

- Apply by DIP — SPRAY — or BRUSH.
- WATER FLUSH — or RAG WIPE.
- REFINISH.

PHOENIX COLD STRIPPER

★ Will not affect precision parts of ferrous and non-ferrous metals, wood or glass.

★ Non-corrosive, Non-evaporating, Non-toxic.

★ Does not lose strength through usage. Just add new stripper to replace drag-out.

Salvage Expensive Rejects At Low Cost!

Write for SAMPLES and QUOTATIONS,
or ORDER 5 GALLON AT DRUM PRICE.

PHOENIX ABRASIVE & CHEMICAL CO.
Dept. M
657 BERRIMAN ST., Brooklyn 8, N. Y. • NIghtingale 9-2771

up for both chromic and sulphuric acid work, and a new installation for treatment of magnesium in all its phases.

Other new equipment includes: New silver and new gold set-ups of five tanks each for plating small electronic parts; a new 600 gallon brass tank to handle the firm's growing volume of commercial work, which includes such jobs as brass plating bird cages; a new 200 gallon tin tank and auxiliary equipment for tin plating electronic parts.

Norman Polen, owner, reports that he has moved his Aladdin Metal Finishing Co. from 55 East Angeleno Ave., Burbank, Calif., to a larger new plant at 1010 Chestnut St., Burbank.

The new facilities occupy a 13,000 square foot building. The building, holdover, and new equipment, represent a $100,000 investment, Polen reported. New installations include a 2,000 gallon nickel tank, which brings the plant's total nickel solution to 2,500 gallons; and new 1,000 gallon tanks for copper, chromium and galvanizing. Cadmium and barrel plating facilities are among the equipment moved over from the old plant.

The firm has been in existence 10 years, the last 1½ under Polen's ownership.

Arthur D. Gask'n, part-owner of Alert Supply Co., Los Angeles, and *Harvey Hunt*, sales engineer, spent two weeks in Detroit between January 14 and 28 attending a sales conference at the general offices of the Northwest Chemical Co., for which firm Alert Supply Co. serves as West Coast distributor. Gaskin and Hunt also visited the home office of H. A. Montgomery Co. in Detroit, for whose coatings and drawing compounds Alert is western distributor.

Rhys N. Ricky joined the sales engineering staff of Soc-Co Plastic Coating Co. of Paramount, Calif., on February 1 after several years in sales capacities for the New England Lead Burning Co. in Whittier, Calif., and the LeFort Co. of Vernon, Calif. Ricky had a distinguished record as a member of the U. S. Air Force in the European theater during World War II, leaving service with rank of captain. Before assuming his duties with Soc-Co Plastic, he put in a month's service as an Air Force reservist in Japan and Formosa and, incidentally, was promoted to the rank of major.

According to *J. Stuart Krentel*, sales engineer of Hanson- Van Winkle-Munning's Los Angeles branch, who spent three weeks south of the border with Mrs. Krentel in January, Mexican platers have the same problems and operate in the same manner as those in the United States

"Shops down there," Stu said, "are as modernly equipped and as well operated as any in Los Angeles, Chicago or Detroit. You don't know you're in a foreign shop until you ask some tank man or polisher a question and he shoots a Spanish answer back at you."

Mexico City plating plants, according to Stu, have the same problems as their northern operators. Polishers,

SPEED-UP your nickel stripping with STRIPODE

PROTECT the base metal

A proved addition agent, STRIPODE strips nickel plate faster and protects the base metal from pitting, roughening and etching. Also saves on use of acid, eliminates need of sand blasting or heavy buffing operation. Try it!

ORDER A TRIAL GALLON!

THE CHEMICAL CORPORATION
54 Waltham Avenue
SPRINGFIELD • MASSACHUSETTS

Just ONE phone call... for ALL your finishing needs!

CALL HOLLAND FOR *IMMEDIATE DELIVERY* ON
POLISHING
PLATING
SPRAY
EQUIPMENT
AND SUPPLIES

J. HOLLAND & SONS, INC.
475 KEAP ST., BROOKLYN 11, N. Y.
TEL. EVERGREEN 7-3315

METABOND

MEANS *PROGRESS* IN RUSTPROOFING

METABOND is the only effective immersion or spray amorphous type zinc coating in the industry today.

METABOND withstands severe and consistent flexing and bending without chipping or breaking bond.

IRCO PRODUCTS

INTERNATIONAL RUSTPROOF CORPORATION

12507 PLOVER AVENUE • • • • CLEVELAND 7, OHIO

MANUFACTURERS OF RUST PREVENTIVES AND CORROSIVE SOLVENTS

he said, are just as hard to get, and the good ones are just as temperamental as those north of the Rio Grande.

Krentel's guide in Mexico City was *Sergio Leites* of Almex, S. A., representatives for H-VW-M in Mexico City. Plating shops inspected by Stu included Cromexal, S. A., Racubrimicientos Metalicos, S. A., and the General Electric Co.'s shop.

While much of the plating equipment in Mexican shops is of U. S. origin, Krentel also found that German and Swedish equipment is finding a ready market south of the border.

The Ador Corp., manufacturers of aluminum sliding glass doors, recently completed a new 50,000 square foot plant in Fullerton, Calf., which *Karl Reinhard*, president, reports, is the only sliding door plant in the world equipped with its own anodizing facilities. Eight large anodizing tanks have been installed for the purpose.

Reinhard is best known in Southern California as the founder of Kwikset Locks, Inc., in Anaheim, Calif., one of the country's major hardware manufacturers. Reinhard retired in 1952, returning to active business in 1953 by establishing the Ador Corp.

California Testing Laboratories, Inc. of Los Angeles reports completion of a new 5,000 square foot building at 1724 Trinity St. which is now being occupied by the firm's Research and Development Division. In addition to present equipment for research, development and qualification testing of components in the environmental and general engineering fields, which has been moved over from the old building, considerable new machinery has been installed. This includes a 1,000 lb. capacity tensile testing machine, three 12,000 pound creep-upture machines, and a recorder for testing high temperature tensile strength.

Chainveyor Corp. of Los Angeles, manufacturers of tubular overhead conveyors for the plating, industrial finishing and other industries, announces two executive changes, as follows:

Frank G. Birkhead has been named chief engineer with headquarters at the firm's main office, 5618 East Washington Blvd., Los Angeles. Birkhead was formerly with Latex Corp., Dover, Del., as head of automation research.

Edward Russel, who formerly served as a consulting engineer with the Green Engineering Co., Pasadena, Calif., has been appointed to the field service engineering staff in the western region.

Turco Products, Inc., reports the appointment of *Joseph Horacek, Jr.*, as assistant sales manager. Horacek spent the past 17 years with Hercules Powder Co. as director of west coast sales of industrial chemicals.

Jerry Clark has transferred from Monsanto Chemical Co. for which firm he handled sales in the Los Angeles area, to the post of sales engineer in Southern California for Detrex Corp. Clark will cover the central manufacturing district of the Los Angeles eastside, plus the counties of Orange, Riverside and San Bernardino.

Dr. Arnold O. Beckman, president of Beckman Instruments, Inc., Fullerton, Calif., manufacturers of pH instru-

Engineered for Extra Years of Trouble-Free Operation

WALKER
Selenium Rectifiers

You can't beat Walker Selenium Rectifiers for dependable D.C. regardless of the size of your plating installation.

These outstanding rectifiers are especially designed to give year in, year out service . . . minimum maintenance . . . no moving parts . . . nothing to wear out . . . nothing to get out of adjustment.

You get more for your money when you use Walker Selenium Rectifiers. Get the complete story, today. Write

The Walker Division Norma-Hoffmann Bearings Corporation

THE WALKER DIVISION
NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT

Prompt Delivery

NICKEL ANODES

NICKEL SULFATE — NICKEL CARBONATE
NICKEL CHLORIDE — COPPER CYANIDE
All Plating Chemicals

IRITOX CHEMICAL COMPANY

5 Union Square West, New York 3, N. Y.

WAtkins 4-1977

ments and other measuring devices, was elected president, in January, of the Los Angeles Chamber of Commerce.

OBITUARIES

GUERIN TODD, SR.

Guerin Todd, Sr., vice-president of the *Hanson-Van Winkle-Munning Co.* died of a heart attack on Jan. 24th in Riverview Hospital, Red Bank. He was 60 years old.

Mr. Todd was also vice-chairman of the board of directors of the company, which manufactures electroplating machinery and devices.

A native of Newark, Mr. Todd was graduated from Stevens Institute of Technology in 1916. In World War I, he was an aviator with the American forces in France. He was seriously injured when his plane was shot down several months before the war ended.

Mr. Todd's first employment as an engineer was with the Hanson-Van

Winkle Co. of Newark. In September, 1927, when that company was merged with the A. T. Munning Co. of Matawan, Mr. Todd became chief engineer of the merged concern and a member of its board of directors. He was elected vice-president in 1939, and in 1948 became vice-chairman of the board of directors.

Mr. Todd was associated for many years with the development of full automatic conveyors for the electroplating industry and held several patents on conveyor devices.

Survivors are his widow, *Mrs. Helen Todd;* a son, *Guerin Todd, Jr.*, a lawyer with the Department of Defense; a daughter, *Mrs. Warren Wilkinson* of Rumson, and eleven grandchildren.

ROLAND J. DOUCETTE

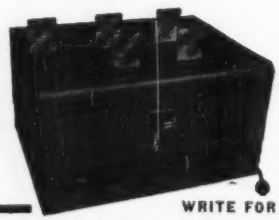
Frederick Gumm Chemical Co., Inc., Kearny, New Jersey, manufacturers of metal cleaning and stripping products, announces with deep regret and personal sorrow, the death of its general sales manager, *Roland J. Doucette*, on January 4, 1956.

Associated with the company since 1937, he first looked after its interests in the New England Territory as field service representative. In 1940 he was appointed sales manager and, in 1953, general sales manager. He was long active in the Newark Branch of the A.E.S.

Mr. Doucette came from Waterbury, Conn. and was previously associated with Scovil Mfg. Co. and Lux Clock Co. His home was in Arlington, N. J.

IMPROVE YOUR PLATING
WITH PERIODIC-REVERSE UNITS

OF FINEST QUALITY



UPA

WRITE FOR INFORMATION

UNIT PROCESS ASSEMBLIES, INC.

Mfgrs. of Periodic-Reverse Units and Electronic Controls for the Plating Industry

61 East Fourth Street New York 3, N. Y.

Zialite

Reg. U. S. Pat. Off.

for NICKEL PLATING

The one bath especially designed for plating DIRECTLY on ZINC, LEAD, ALUMINUM, BRASS, COPPER and IRON.

for HARD CHROMIUM

USE Zialite ADDITION AGENTS

Harder deposits. Increased throwing power. Less sensitivity to sulfate content. Exceptionally fine results plating anything calling for Decorative or Hard Chrome.

ZIALITE CORPORATION

92 GROVE STREET WORCESTER 5, MASS.

PURE NICKEL SCRAP

Min. 99% PURE

PHONE- -WRITE- -WIRE

WOLVERINE METAL CO.

6500 E. ROBINWOOD • DETROIT 34, MICHIGAN

PHONE TWINBROOK 3-0800

SUBJECT TO RECASTERS ACCEPTANCE

FOR CONVERSION TO ANODES FOR BRIGHT NICKEL PLATING

Manufacturers' Literature

Tumbling Barrels

Hartford Steel Ball Co., Dept. MF, Hartford 6, Conn.

The above firm has issued a specification sheet on its triple action enclosed cutting barrels. Their advantages are listed, as well as optional features and specifications.

Copies of the sheet are available on request.

Complete Buff Line

Hanson-Van Winkle-Munning Co., Dept. MF, Matawan, N. J.

An illustrated 12-page bulletin covers the full range of H-VW-M buffs. The bulletin, No. B-103, describes and displays the three different types of buffs used in cutting down and coloring: pieced buffs, the least expensive, used for lighter work; full-disc buffs, for medium to light duty; and Ruff-L-Buffs, for heavy duty. The advantages of Binderized buffs are shown in close-up photos.

The different methods of sewing buffs—single sewing, concentric sewing, hand quilting, petal sewing, spiral sewing, and radial, square and parallel sewing—are explained and illustrated. Such pertinent information as grades of cloth, ruffle patterns, diameter sizes, hole sizes and flange designs is given in detail.

Stainless Steel Centrifugal Pump with Pedestal Mount

ECO Engineering Co., Dept. MF 12 New York Ave., Newark, N. J.

A new flyer describes the Centri-Chem Type 20 stainless steel centrifugal pump on a pedestal mount for any standard motor or belt drive.

The chemical resistance and construction features of the Type 20 stainless alloy pump which make it a basic unit for standardization programs are detailed, as are performance data, mechanical advantages and low cost.

Double-Ended Pump

Chempump Corp., Dept. MF, Station J, 1300 East Mermaid Lane, Philadelphia 18, Pa.

A new four-page, two-color Bulletin 1020 gives full information on Series DE (double ended) Chempumps, newest addition to the above manufacturer's line of seal-less "canned" motor centrifugal pumps. A cutaway view shows the method of using two impellers and pump chambers at either end of pump motor section for high head service and nearly perfect hydraulic balance. The bulletin includes full details on performance, diversion and operating principles.

Package Type Dust Collector

Green Fuel Economizer Co., Inc., Dept. MF, Beacon, N. Y.

A packaged type Aerodyne dust collector, designed for broad use in industry is described fully in Bulletin 172-CFF. Copies may be obtained by writing to the above manufacturer.

Cleaning with Solvent Detergents

Oakite Products, Inc., Dept. MF, 118 Rector St., New York 6, N. Y.

The cleaning uses and abilities of solvent detergents — solvents compounded with surface active agents—

BOSTON BRANCH
AMERICAN ELECTROPLATERS' SOCIETY
TWENTIETH ANNUAL
TECHNICAL SESSION AND BANQUET
MAY 5, 1956
HOTEL STATLER BOSTON, MASS.

AUTOMATIC AND SEMI-AUTOMATIC MACHINES
POLISHING • DEBURRING • WIRE BRUSHING
BUFFING • ABRASIVE BELT GRINDING
If you perform any of the above operations on work that can be chucked, it will pay you to investigate our line of equipment.
Shown at left is a model designed to handle articles from 6" dia. x 1¼" long to 3" dia. x 5' long where high production is a must.
Type K2
Send samples of work for recommendations.
AUTOMATIC BUFFING MACHINE CO.
222 CHICAGO ST. Est. 1909 BUFFALO 4, N. Y.

DICTIONARY OF METAL FINISHING CHEMICALS
$3.00 PER COPY
BOOK ORDERS PAYABLE IN ADVANCE
FINISHING PUBLICATIONS, INC.
381 BROADWAY WESTWOOD, N. J.

SELL IT THRU WAGNERS
WE WANT new products to sell. We want new ideas to develop for the national metal finishing market. Our active sales force is your assurance of volume. Our successful launching of new products such as anodes, automatics, filters, and rectifiers has given us the experienced background to market your line. Our technical staff will develop or service your product, our manufacturing facilities will produce it, and our sales organization will distribute it nationwide with profit and protection for you.
Phone, wire or write
JOE WAGNER
Wagner Bros., Inc.
Midland at Ross
Detroit 3, Mich

are described in a recently revised booklet.

The sixteen-page, illustrated booklet tells how solvent detergents, used without heat, remove oil films, smuts, cutting, drawing and stamping compounds, zinc chromate primers from aluminum, and synthetic paints from steel, while providing temporary protection against rust after painting.

Methods of application, manual, spray, tank, and machine, are described in detail including procedures and solution concentration. Application equipment is both illustrated and discussed. Some of the advantages claimed for this cleaning method by the above manufacturers are pointed out in the booklet.

Speed Chart for Buffing and Grinding

Hanson-Van Winkle-Munning Co., Dept. MF, Church St., Matawan, N. J.

A handy 3 x 5 in. disk chart for determining the surface speed of buffing and grinding wheels is now available from the above company.

Printed in two colors, the chart enables one quickly and easily to know the surface speed, in feet per minute, of any wheel from 1 in. to 60 in. in diameter, turning at spindle speeds of from 220 to 20,000 r.p.m.

Plating Waste Treatment & Chrome Recovery

Graver Water Conditioning Co., Dept. MF, 216 West 14th St., New York 11, N. Y.

Technical Reprint T-143 is a case history which discusses the method used to obtain water re-use and metal recovery and the dollar savings realized after the system was put into operation. The article goes into the details of the plant operation, the design of the recovery system, the operational cycle and the benefits derived.

In addition to photographs of the equipment, there is a flow diagram of the waste treatment plant.

Training Electroplaters

Joseph B. Kushner Electroplating School, Dept. MF, 115 Broad St., Stroudsburg, Pa.

The way electroplaters are trained through correspondence study is interestingly explained in a new illustrated eight-page booklet called "Educating Electroplaters By Mail." The booklet describes and illustrates the operation of the plating industry's only school exclusively devoted to home study training. It shows how the home study course given, *Electroplating Know How*, is used to upgrade electroplaters and how in many cases it replaces on-the-job training for plating personnel; it lists some of the better known organizations who are using this method for improving their plating results. The booklet, printed in two colors, is offered free of charge to everyone requesting a copy.

Sisal Buffs

American Buff Co., Dept. MF, 2414 S. La Salle St., Chicago 16, Ill.

An actual sample of sisal yarn with only one end chemically treated is featured in a new, informative booklet now available free to buff users. Appropriately entitled, "What *You* should know about the 'Golden Treatment' on sisal buffs," the pocket size manual is an easy-to-read reference which scientifically, yet concisely explains why sisal and cloth require this exclusive new process recently developed by the above manufacturer. From experimentation to the finished buff, the booklet depicts results of the treatment. The fiber strand comparison

HAMILTON MILLS

INDIAN BRAND

TURKISH EMERY

For color and lustre beyond compare, specify INDIAN BRAND TURKISH EMERY. Preferred by those who know the best.

Also available — HECCO BRAND AMERICAN EMERY, for use in abrasive pastes and compositions.

HAMILTON EMERY & CORUNDUM CO.

CHESTER, MASS.

"TREMENDOUS HELP"

"Your course has been of tremendous help in clearing up our problems," writes W. H. Blanck, plating executive for the Stewart Warner Corp. You too will find this astonishing home study course of tremendous help if plating is your problem. Why not investigate? No salesman will call. Write to **Joseph B. Kushner, Electroplating School 115 Broad St., Stroudsburg 30M, Pa.**

SPEEDIE TRIPOLI COMPOSITIONS

Do YOU Buff Die Cast?
THEN TRY OUR

T-167 TRIPOLI

at an unbeatable low price!

Here's a new number we recently developed—a natural for buffing die cast. Already tried in a number of shops, T-167 results have gained enthusiastic approval! A *good* buffing compound, *readily* cleanable, T-167 SPEEDIE Tripoli Composition carries a price tag that will knock your eye out. If you're having trouble buffing die cast don't delay any longer — write or order today . . . on company letterhead . . . for sufficient quantity of T-167 to make a production run, and convince yourself of what this remarkable bar will do — for *you*!

If you want *liquid* compounds for die cast, aluminum or steel, you will want to try SPEEDIE "*Spray-It*" Buffing Compounds.

Write for FREE catalog today.

The BUCKEYE PRODUCTS Co.
7033 Vine St. Cincinnati 16, Ohio

test permits each buff user to see and feel the difference in the fiber before and after the treatment.

Review of Zinc Industry

The American Zinc Institute, Inc., Dept. MF, 60 East 42nd St., New York 17, N. Y.

This new 13-page book summarizes the production and consumption picture of the zinc industry as it appeared to be as of December 31, 1955. Comprehensive tables cover such topics as mine production, imports of slab and ore, tariff rates, slab zinc consumption, zinc uses by grades and production of slab zinc according to grade. Consumption of zinc for die casting, galvanizing, and pigment production is discussed in some detail. Figures are given reviewing stocks of slab zinc on hand at the end of the year.

Paint and Phosphate Coating Removal

Oakite Products, Inc., Dept. MF, 118 Rector St., New York 6, N. Y.

The removal of stubborn paint and phosphate deposits by the use of Oakite Rustripper is described in a newly revised folder.

The folder graphically shows how the use of this new alkaline rust, paint, and oxide scale remover can eliminate separate rinsing, pickling, and neutralizing operations on rejects, products that may have rusted during production, and used products that are to be reconditioned.

Metal Cleaning Equipment

Solventol Chemical Products, Inc., Dept. MF, 15841 Second Blvd., Detroit 3, Mich.

A four-page illustrated brochure has been issued, featuring metal cleaning equipment. Construction features, spray and blow-off features and heating systems are listed, for individually engineered equipment.

Additional information may be obtained by writing directly to the manufacturer at the above address.

Temperature Instruments

H. O. Trerice Co. Dept. MF, 1420 W. Lafayette Blvd., Detroit 16, Mich.

Bulletin 803 covers temperature instruments for the metal finishing industry. Uses for each type are listed, including how to select and order them. Three typical and basic plating installations are also given and diagrammed.

Synthetic Rubber Coating

Carboline Co., Dept. MF, 331 Thornton Ave., St. Louis 19, Mo.

A new, four-page color bulletin on *Neoprene W*, a single-package synthetic rubber-coating, for use in corrosive atmospheres in general plant maintenance, lists the basic characteristics, including uses, ease of application, versatility, abrasion resistance and weathering properties. A section on economy discusses the importance of coating selection based on "cost per sq. ft. per year of service." Chemical resistance data are also shown.

Burnisher and Dryer

Hanson-Van Winkle-Munning Co., Dept. MF, Church St., Matawan, N. J.

A new portable type Mercil burnishing barrel and a new Mercil No. 1 Dryer are described in a two-page bulletin, MBD-100.

The advanced design of this new burnisher plus its portability make it particularly applicable to jewelry polishing and deburring and cutting down of other materials. A photograph of the portable burnishing barrel illustrates the text.

The bulletin describes dimensions, work load capacities and power requirements of both units.

SOMMERS BROS. MFG. CO.

MFRS. OF "BEACON"

Plating and Polishing Supplies and Equipment —Complete Semi and Full Automatic Installations—Gold, Silver and Chrome Rouge, Stainless Steel and Satin Finish Compounds—Buffs, Polishing and Felt Wheels.

3439 NO. BROADWAY
ST. LOUIS 7, MO.

Truly—Three Great Finishes!!

CHROMIUM - UDYLITE
SHERARDIZING

For over a quarter of a century building and installing portable sherardizing furnaces and equipment: metal finishing and plating.

We invite your inquiry.

THE NATIONAL SHERARDIZING & MACHINE CO.

OFFICE & FACTORY: HARTFORD, CONN.

Foreign Representatives—

Oliver Bros., Inc., 417 Canal St., N. Y. City

ANODES PRICE GUIDE

ATTENTION

Nickel anodes up to 93 inches in length — cast in new shell mold process. This unique method of casting produces anodes of the highest purity — with optimum metallurgical properties. Density of anodes is at a maximum and excellent surface is obtained. These factors account for longer life in plating bath.

NICKEL CASTING PRICE SCHEDULE

ANY QUANTITY

15c PER POUND

FOB UNIVERTICAL

Net Yield of New Nickel 98% minimum — Net yield of Scrap Nickel 96% minimum. F. O. B. Univertical — Terms: Net 10th and 25th Prox.

Write or wire for best price and delivery on the following Anodes:

Copper-Electro Deposited
Copper-Cast Round 3" Dia.
Copper-Cast Round 2½" Dia.
Copper-Cast Beehives
Copper-Cast Balls
Copper-Forged Balls
Copper-Rolled Oval 1½" x 3" Eliptical Tough Pitch Copper
Copper-Rolled Oval 1½" x 3" Plus 4

White Brass—Balls 85% Zinc—15% Copper — White Brass—Balls 65% Zinc—35% Copper
Brass Balls — To Specifications.

UNIVERTICAL FOUNDRY & MACHINE CO.

14841 MEYERS RD. • Broadway 3-2000 • DETROIT 27, MICHIGAN

ADVERTISING RATES
Per column inch per insertion

1 time	$10.00
3 times	9.00
6 times	8.50
Yearly (12 times)	8.00

READY-REFERENCE SECTION
—USED EQUIPMENT AND SUPPLIES—

ELECTROPLATING
POLISHING
RUST PROOFING
CLEANING
ANODIC TREATMENT
ETC.

FOR SALE

PLATING MOTOR GENERATOR SETS (REBUILT) WITH COMPLETE PANEL EQUIPMENT — MOTORS — 3 PHASE, 60 CYCLE, 220/440 VOLT.

1—Hanson-Van Winkle-Munning 1000 ampere, 3-40 volt, interpole, 900 RPM. Exciter in head, Synchronous motor. Ser. #11152.

1—Chandeysson Electric 1000 ampere, 6 & 12 volt, Exciter in head, Synchronous motor.

1—Eager Electric 5000 ampere, 6 & 12 volt driven by 50 HP induction motor. Excited by "V" belt exciter.

1—Bennett & O'Connell 200 ampere 6 & 12 volt. 680 RPM, separately excited. Ser. #3926.

POLISHING LATHES — New & used — Constant & variable speed, single & double motor drives — 3 phase, 60 cycle, 220/440 volt. 1 to 20 HP in stock.

1—Hammond type J rotary Auto. 5 stations, 3 heads. Magnetic chucking.

1—Udylite rotary semi-auto. 6 stations, 4 heads. 66" table. Ea. head 7½ HP.

1—Production #101 tube polisher unit.

REBUILT RECTIFIERS — For Plating — 3 phase, 60 cycle, 220 volt.

2—400 amp. 0-6 volt Mallory-Udylite self contained.

6—500/6 volt Basic General Electric converted to selenium rectifiers.

10—Mallory Udylite 1500/6 & 12 with remote controls — Priced to sell.

MERCIL - CROWN - BAIRD - LASALCO - GLOBE BURNISHING & TUMBLING BARRELS

1—Crown Roto-Finisher barrel — dbl. compt. size of each compartment — 22" long x 36" deep.

1—Crown Oblique plating barrel unit — rubber lined.

NEW SELENIUM RECTIFIERS, complete with instruments, starter and built-in voltage regulation. All sizes from 50 amperes to 6000 amperes.

IMMEDIATE DELIVERY ON THE FOLLOWING SIZES — 3 phase, 60 cycle, 220 volt.

4000 ampere, 0-12 volt
2000 ampere, 3-6 volt OR 2000 ampere, 6-12 volt
1500 ampere, 3-6 volt OR 1500 ampere, 6-12 volt
1500 ampere, 0-12 volt
1500 ampere, 4-9 volt.

ALSO AVAILABLE — OTHER NEW AND REBUILT POLISHING LATHES, BARRELS, RHEOSTATS, RECTIFIERS, FILTERS, BLOWERS AND GENERATOR SETS. WE CARRY A COMPLETE LINE OF NEW AND REBUILT PLATING AND POLISHING EQUIPMENT AND SUPPLIES.

CLINTON SUPPLY COMPANY

112 South Clinton Street
Chicago 6, Illinois
FRanklin 2-3753

PLATERS AND ANODIZERS

M-G SETS — Motor 3-60-220/440

Amp.	Volt	Make
100	7½	Hobart
175	14	Delco
200	7½	Chandeysson
300	7½	Hobart
400	60/60	G. E.
500	6	Chandeysson
500/250	6/12	Elec. Prod.
750/375	6/12	Excel
940	32	Elec. Prod.
1500	30/50	Century
1500	40/65	G. E.
1500	65	Westinghouse
1500	70	Century
2000/1000	6/12	H-V-W
2500/1250	6/12	Elec. Prod.
5000/2500	9/18	Chandeysson

BLOWERS & EXHAUSTERS

CFM	Pres.	Make
1100	4½" S.P.	Bayley
2344	2" S.P.	Claraqe
2500	½" S.P.	American
2700	⅝" S.P.	Ilg
3420	8" S.P.	New York
9000	6" S.P.	Northern

MOTOR REPAIR & MANUFACTURING CO.

1555 HAMILTON AVE., CLEVELAND, OHIO

FOR SALE

•

Slightly Used

BUFFS

•

Loose and Sewed

•

Any Quantity

MICHIGAN BUFF CO., INC.

3503 GAYLORD AVENUE
DETROIT 12, MICHIGAN

PLATING MACHINE FOR SALE

Udylite chainless return type fully automatic plating machine with full power, all controls, bus bars and work-holding racks. Used for lead, tin. Excellent condition. Contact Louis Belken, Atwood Vacuum Machine Co., 1400 Eddy Ave., Rockford, Ill.

AVAILABLE FOR IMMEDIATE SHIPMENT, ATTRACTIVE VALUES

THE FOLLOWING EXCELLENT REBUILT AND GUARANTEED ELECTROPLATING MOTOR GENERATOR SETS AND RECTIFIERS, WITH FULL CONTROL EQUIPMENT:

— PLATERS —

1—7500/3750 Ampere, 9/18 Volt, Hanson-Van Winkle-Munning, Synch.
1—6000/3000 Ampere, 6/12 Volt, Chandeysson, Synch., Exc.-in-head.
1—5000/2500 Ampere, 6/12 Volt, Chandeysson, Synch., Exc.-in-head.
1—4000/2000 Ampere, 6/12 Volt, Chandeysson, 25°C., Exc.-in-head.
1—3000/1500 Ampere, 12/24 Volt, Chandeysson, Exc.-in-head.
1—3000/1500 Ampere, 6/12 Volt, Columbia, Synch.
1—2500/1250 Ampere, 9/18 Volt, Electric Products, Synch., Exc.-in-head.
1 -2000/1000 Ampere, 9/18 Volt, Electric Products.
1—1500/750 Ampere, 6/12 Volt, Hanson-Van Winkle-Munning, Synch., Exc.-in-head.
1—1500/750 Ampere, 12/24 volt, Chandeysson, Synch., Exc.-in-head.
1—1000/500 Ampere, 6/12 Volt, Electric Products.

— ANODIZERS —

1—4000 Ampere, 40 Volt, Chandeysson, Exc.-in-head.
1—1000 Ampere, 40 Volt, Chandeysson,
1—1000 Amp., 30 V., Ideal, Exc.-in-head.
1—750 Ampere, 60 Volt, Hanson-Van Winkle-Munning, Synch., Exc.-in-head.
1—500 Ampere, 25 Volt, Chandeysson, Synch., Exc.-in-head.

— RECTIFIERS —

1—2000/1000 Ampere, 6/12 Volt, G. E. Copper Oxide, with Manual Control.
1—2000/1000 Ampere, 6/12 Volt, G. E., brand new Selenium Stacks, with "On-load" Automatic Voltage Regulator.
1—Green Selectoplater, 1800 Ampere, 12 Volt, 220/3/60.
3—Brand new 2000/1000 Ampere, 6/12 volt, G. E. Copper Oxide Rectifiers, with Controls.

— SPECIAL —

1—20' x 4' x 3' H-VW-M Semi-Automatic, for nickel.
1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for copper and nickel.
1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for chrome.
1—H-VW-M Full-Automatic Plating Machine, 40' long, 39" lift, was used for cleaning.
1—Production Pipe Polishing Machine, Model 101, Motorized.
2—Ronci Enamelers, No. R-100 and R-200.
1—K-4 Semi-Automatic Buffing Machine.
3—U. S. Elec. Tool, Mod. 110, Twin 15HP Polishing Lathes.
1—Model "A" Pressure Blast.
1—Tollhurst Centrifugal Dryer, 20" dia. basket, with Steam Heat.

Above is partial list only. Write to us for all your requirements for Plating, Anodizing and Metal Finishing.

WIRE — PHONE — WRITE

M. E. BAKER COMPANY

25 WHEELER STREET, CAMBRIDGE 38, MASS.
Phone: Kirkland 7-5460

ADVERTISING RATES
Per column inch per insertion
1 time - - - $10.00
3 times - - - 9.00
6 times - - - 8.50
Yearly (12 times) 8.00

READY-REFERENCE SECTION
—USED EQUIPMENT AND SUPPLIES—

ELECTROPLATING
POLISHING
RUST PROOFING
CLEANING
ANODIC TREATMENT
ETC.

LARGE ASSORTMENT OF PLATING TANKS
PRICED RIGHT

L.	W.	D.		L.	W.	D.	
20"	x 14"	x 48"	Rubber	48"	x 30"	x 36"	Rubber
20"	x 20"	x 20"	Steel	60"	x 30"	x 30"	Rubber
24"	x 18"	x 30"	Steel	60"	x 36"	x 32"	Rubber
30"	x 24"	x 30"	Steel	71"	x 32"	x 42"	Koroseal
36"	x 24"	x 36"	Lead	72"	x 36"	x 36"	Rubber
36"	x 36"	x 36"	Steel	84"	x 36"	x 36"	Rubber
48"	x 24"	x 24"	Wood	90"	x 42"	x 30"	Rubber
48"	x 24"	x 24"	Koroseal	127"	x 60"	x 42"	Rubber

MANY OTHERS — WRITE FOR LIST
Rectifiers — 25 Amperes to 10,000 Amperes
Airbuffs — Compounds — Anodes — Chemicals, etc.
For Quality, Dependability & Service call on:

BRUCAR EQUIPMENT & SUPPLY CO.
WAREHOUSE: 602-604 - 20TH STREET BROOKLYN, N. Y.
Telephone: STerling 8-0236 - 7 - 8

RECONDITIONED EQUIPMENT
PRICED TO SELL EVEN TO DEALERS

TUBE POLISHING EQUIPMENT
1—Production Machine 10 H.P. Excellent Condition
1—Production Machine 101 Single Wheel feed 10 H.P.
1—Production Machine 101 Double roll feed.
1—Duplex 484 Production, Like New.
1—60" Packermatic Rotary Table, 12 Spindle.
1—4 Spindle Semi-Automatic.
1—8 Spindle Semi-Automatic.

RECTIFIERS
1—2000 amp. 6/12 volts G. E.
1—2000 Amp. 6/12 volts Lewis.

GENERATORS
1—Chandeysson 1000 amp. 40 v. Comp. Ex. Con.
1—1000/500 amp. 6/12 v. Bogue outside ex.
1—5000/2500 amp. 8/16 v. Bogue.

POLISHING LATHES
1—U. S. Variable speed 5 H.P.
2—Gardner 5 H.P.
1—Double Pesco 5 H.P.

SILVER POLISHING SET UP
1—Double 15 H.P. Pesco Polishing Lathe.
1—8-10 Acme with A-2 head and expanding chucks.
1—Automatic Single Spindle Machine with Stroke.

FILTERS
1—Belke, rubber lined 750 G.P.H.
1—10 x 28 Rubber Lined.
1—10 x 22 Lead Lined
1—SDNR8 Alsop S.S.
1—SDWR8 Alsop Steel
1—SDWR12 Alsop

CENTRIFUGALS
1—H. V. W. 18" dryer & basket.
1—Kreider 12".
2—Ronci #R-100 Speed dip lacquering or enameling centrifugals.
1—Ronci #R-200.

TANKS
5—60"x36"x36" stainless steel, complete with overflows, ducts, and pipe connections.
2—Rubber Lined 8' x 54" x 48".

MISCELLANEOUS
5000 lbs. Clepo 171-A.
800 lbs. Roto Finish Compound #300.
800 lbs. Zinc Carbonate.
1300 lbs. Magnus 55 P.
1000 lbs. Multi Burnish Compound Honite.
800 lbs. Dyclene E. S.

"IF IT'S METAL FINISHING EQUIPMENT OR SUPPLIES WE HAVE IT"

Pesco Plating Equipment Corp.
75 Wythe Ave., Brooklyn 11, New York
EVergreen 4-7472

Priced To SELL!

RECTIFIERS — GENERATORS — EXHAUST FANS
HEAT EXCHANGERS — PUMPS
GEARED HEAD MOTORS

RECTIFIERS
1—30,000 Amp., 12 Volt Bart-Messing, new '53
1—15,000 Amp., 12 Volt Bart-Messing, new '53
1—6000 Amp., 12 Volt Hanson-Van Winkle
1—4000 Amp., 12 Volt Bart-Messing
1—3000 Amp., 18 Volt Hanson-Van Winkle
1—3000 Amp., 6 Volt Bart-Messing
1—2000 Amp., 6 Volt Hanson-Van Winkle
2—1500 Amp., 6 Volt Richardson-Allen
1—1000 Amp., 6 Volt Hanson-Van Winkle

MOTOR GENERATOR SETS
1—10 000/5000 Amp. Electric Products, 9/18 volts
1—10 000/5000 Amp. Hanson-Van Winkle, 12/24 volts
1—5000/2500 Amp. Electric Products, 9/18 volts
1—3200 Amp. General Electric, 24 volt
1—1600 Amp. General Electric, 24 volt
1—1000 Amp. Century, 24 volt
1—750 Amp. Westinghouse, 24 volt

HEAT EXCHANGERS
2—Industrial 12 Graphite Tubes, 6400 gallon heating, 320,000 BTU cooling
3—Industrial 6 Graphite Tubes, 4800 gallon heating, 160,000 BTU cooling

PUMPS
10—Sump Pumps 1 HP to 7½ HP
15—LaBour, Industrial, lead lined, stainless steel and Duriron Centrifugal Pumps

EXHAUST FANS
10—Buffalo size 450C, 450D, 400D and 375C vent sets

MOTORS
10—½ & 1 HP Boston ratio motors for oscillation motions
4—2 & 3 HP geared head agitators

SEND US ALL YOUR INQUIRIES!

L. J. LAND, INC.
146-148 GRAND STREET, NEW YORK 13, N. Y. Phone: CAnal 6-6976
Established 1910

PLATING PLANT FOR SALE

Complete modern decorative chrome plating plant in operation. Includes 4500 and 3500 gal. nickel semis, 2700 gal. copper semi . . . with all necessary auxiliary equipment. Available with or without solution. Sacrificing for quick sale to make room for larger automatic equipment. Write or phone for full information.

LAKE ERIE PLATING CO.
26420 Lakeland Blvd. Euclid, Ohio
REdwood 2-8300

EQUIPMENT FOR SALE

1953 Stevens automatic phosphatizing or plating machine. Excellent condition. Complete with motors, blowers and duct work. Fully automatic with 0-20 minute timer. $25,000 new. Sale Price $9,500.

Water wash spray booth. Binks automatic. Sale price $3,000.

Write or call

TRANTER MFG., INC.
735 E. Hazel St. Lansing, Mich.
Phone: IVanhoe 4-4531

PLATING PLANT FOR SALE OR RENT

Complete plating and polishing plant in New York metropolitan area. Solutions, nickel anodes, etc. 7,000 sq. ft. equipped for copper, nickel, chrome and zinc. Semi-automatic, Rental or sales. Terms can be arranged. Address: March 7, care Metal Finishing, 381 Broadway, Westwood, N. J.

FOR SALE
available for immediate delivery

The finest in
GUARANTEED REBUILT
FINISHING EQUIPMENT

H & S
EQUIPMENT & SALES CO.
483 Keap Street Brooklyn, N. Y.
EVergreen 7-2526

ADVERTISING RATES
Per column inch per insertion

1 time	$10.00
3 times	9.00
6 times	8.50
Yearly (12 times)	8.00

READY-REFERENCE SECTION
—USED EQUIPMENT AND SUPPLIES—

ELECTROPLATING
POLISHING
RUST PROOFING
CLEANING
ANODIC TREATMENT
ETC.

SITUATIONS OPEN

METAL CLEANER SALESMAN

SITUATION OPEN: We need experienced, successful technical sales representative with proven sales record for expanding sales program. Must know plating, phosphating, porcelain enameling, other finishing. Liberal draw, commissions, expenses, car, other benefits.

Write age, experience, income requirements, territory preferences.

COWLES CHEMICAL COMPANY
Metal Cleaner Department
7014 Euclid Ave., Cleveland 3, Ohio

BUFFING COMPOUND SALESMEN

SITUATION OPEN — Distributors, jobbers and manufacturers agents wanted to distribute and sell the full line of Schaffner's polishing and buffing composition in bar, spray or paste form, and a complete line of polishing room supplies.

SCHAFFNER MANUFACTURING COMPANY, INC.
Emsworth, Pittsburgh 2, Pa.

PLATER

SITUATION OPEN—Plater, analytical chemist, production engineer wanted for job shop in consultant position, trouble shooting, plating and metal finishing problems, setting up cycles for barrel plating. Experienced in commercial barrel plating of small parts. Barrel gold, chrome, nickel, copper and silver —also barrel finishing procedure and its compounds, deburring, ball rolling, etc. Cost and time study, recommended and design time saving devices, complete up-to-date laboratory for research and development. Give full business, personal background and salary expected in first letter. Address: September 5, care Metal Finishing, 381 Broadway, Westwood, N. J.

CHEMIST

SITUATION OPEN—Outstanding manufacturer, northern New Jersey area, seeks graduate chemist for industrial laboratory. Some metal finishing background preferred. Must be able to work independently. Diversified position offering excellent growth potential. Please state age, education, experience and recent earnings. Address: March 1, care Metal Finishing, 381 Broadway, Westwood, N. J.

PRACTICAL MASTER PLATER

SITUATION OPEN—Good position open for the right man. He must have several years of all around job plating experience and be capable of analyzing and maintaining practically any plating bath. Ability to supervise and direct others essential. If you feel you can fill these requirements, let us hear from you, stating your background and age. Man over forty preferred. We are a substantial concern and will treat your inquiry in confidence. Address: March 4, care Metal Finishing, 381 Broadway, Westwood, N. J.

DESIGN ENGINEER

SITUATION OPEN—Must be experienced in power washers, degreasers, ovens and general processing equipment. Excellent opportunity. Address: March 3, care Metal Finishing, 381 Broadway, Westwood, N. J.

MANUFACTURER'S REPRESENTATIVE

SITUATION OPEN—Manufacturer's representative wanted with clientele in metal manufacturing to handle Metalwish line of degreasing equipment. Exclusive territories.

METALWASH MACHINERY CORPORATION
Elizabeth 4, New Jersey

ANODIZING SUPERVISOR

SITUATION OPEN—Degree in chemistry or metallurgy preferred, experienced in the control and operation of anodizing systems. Knowledge of color anodizing and chemical brightening required. Must have administrative as well as technical ability. Permanent position, good opportunity, growing organization. Salary negotiable. Address: March 2, care Metal Finishing, 381 Broadway, Westwood, N. J.

ELECTROPLATING SUPT. OR MANAGER

SITUATION OPEN—General manager or superintendent wanted to take complete charge of job plating and polishing plant employing 30 persons. Experience required in all types of plating and anodizing. Give full details of experience, personal details and salary expected.

SUPERIOR PLATING CO.
736 Beacon Ave. Rockford, Ill.

DISTRIBUTORS

SITUATIONS OPEN—Manufacturers representatives and distributors wanted for Ramco vapor degreasers and power washing equipment.

RAMCO EQUIPMENT CORPORATION
801 Edgewater Road New York 59, N. Y.

TECHNICAL SALES — SERVICE

Industrial Chemicals, Metal Processing Chemicals and Equipment

SITUATIONS OPEN—Chemists or chemical engineers with minimum of several years selling and/or service experience. Approximate age limits 24-32. Salary will be commensurate with previous experience and responsibility. Positions open in Gulf States, Southwest, Midwest, and Northeastern areas. Address replies to D. F. Tikker, Manager Marketing Services, Kelite Corp., 81 Industrial Road, Berkeley Heights, N. J.

SITUATIONS WANTED

PLATER

SITUATION WANTED—Plater with fifteen years experience, ten years as foreman, of plating, polishing, buffing and barrel finishing departments. Would prefer a job with small manufacturer. Can furnish the best of references. Address: January 4, care Metal Finishing, 381 Broadway, Westwood, N. J.

PLATER

SITUATION WANTED—I have considerable experience in bright nickels of various types. Have engineered and set up plating rooms from start to finish and have revised the layout of existing plants for better efficiency. Have done research in abrasive tumbling and barrel burnishing and in metal cleaning. Prefer position in metropolitan New York or Long Island area. Address: March 5, care Metal Finishing, 381 Broadway, Westwood, N. J.

SERVICE OR DEVELOPMENT

SITUATION WANTED—Chemical engineer, graduate. Desire position in customer or product development. Experience in plating, solution control, metal treatments and technical service. Boston area. Address: March 8, care Metal Finishing, 381 Broadway, Westwood, N. J.

SUPERVISOR

SITUATION WANTED—Have 35 years in the plating field and am capable of full responsibility. Can maintain and analyze solutions of all types and set up and get out production. Desire position in Metropolitan New York. Address: February 5, care Metal Finishing, 381 Broadway, Westwood, N. J.

ELECTROCHEMIST

SITUATION WANTED—Have thorough experience in chemical formularies or plating baths. Wish position in supervisory capacity in or near metropolitan New York area. Experienced in metals and their alloys and willing to submit resume on request. Address: March 9, care Metal Finishing, 381 Broadway, Westwood, N. J.

PLATER

SITUATION WANTED—Have many years of experience in the decorative plating field, such as lamps, novelties, etc. Seeking position with firm doing gold, rhodium, brass, copper plating, oxidizing, etc. Address: March 6, care Metal Finishing, 381 Broadway, Westwood, N. J.

SUPPLIERS OF EQUIPMENT AND MATERIALS AND ADVERTISERS INDEX

A

Abbott Ball Co. 92
1046 New Britain Ave., Hartford 10, Conn.
Acme Manufacturing Co. 12
1400 E. 9 Mile Rd., Detroit 20 (Ferndale), Mich.
Alert Supply Co. 115
4755 E. 49th St., Los Angeles 58, Calif.
Allied Research Products, Inc. 83
4004 E. Monument St., Baltimore 5, Md.
Almco Div., Queen Stove Works 37
Albert Lea, Minn.
Alsop Engineering Corp. 84
1102 Bright St., Milldale, Conn.
Alvey-Ferguson Co. 100
625 Disney St., Cincinnati 9, Ohio
American Brass Co.
Waterbury 20, Conn.
American Buff Co. 39
2414 S. LaSalle St., Chicago 16, Ill.
American Instrument Co., Inc. 34
Silver Spring, Md.
American Metal Co., Ltd., The
61 Broadway, New York, N. Y.
American Platinum Works
231 New Jersey R. R. Ave., Newark 5, N. J.
A & P Finishing & Mfg. Co.
17760 Clarann Ave., Melvindale (Detroit), Mich.
Apothecaries Hall Co. 14
22 Benedict St., Waterbury 20, Conn.
Atlantic Compound Co. 72
1860 Baldwin St., Waterbury, Conn.
Automatic Buffing Machine Co. 119
222 Chicago St., Buffalo 4, N. Y.
Automotive Rubber Co. 30
12572 Beech Rd., Detroit 28, Mich.

B

Bacon Felt Co.
437 W. Water St., Taunton, Mass.
Baker & Co., Inc. 45
113 Astor St., Newark 5, N. J.
Baker Co., The M. E. 122
25 Wheeler St., Cambridge, Mass.
Barker Bros., Inc. 101
1660 Summerfield St., Brooklyn 27, N. Y.
Bart-Messing Corp. Inside Back Cover
229 Main St., Belleville 9, N. J.
Beam Knodel Co. 110
195 Lafayette St., New York 12, N. Y.
Belke Manufacturing Co. 25, 109
947 N. Cicero Ave., Chicago 51, Ill.
Belmont Smelting & Refining Works, Inc.
304 Belmont Ave., Brooklyn 7, N. Y.
Better Finishes & Coatings, Inc. 97
268 Doremus Ave., Newark 5, N. J.
Blakeslee & Co., G. S. 7
Chicago 50, Ill.
Block & Co., Wesley 32
39-15 Main St., Flushing, N. Y.
Brucar Equipment & Supply Co. 123
Box 433, Hempstead, L. I., N. Y.
Buckeye Products Co. 120
7033 Vine St., Cincinnati 16, Ohio
Buckingham Products Co. 102
14100 Fullerton Ave., Detroit 27, Mich.

C

California Rack Co.
4982 Firestone Blvd., South Gate, Calif.
Casalbi Company
West Ganson & Wayne, Jackson, Mich.
Chandeysson Electric Co. 41
4074 Bingham Ave., St. Louis 16, Mo.
Chemical Corp., The 100, 116
54 Waltham Ave., Springfield, Mass.
Chicago Rubber Co., Inc. 105
2620 N. Clybourn Ave., Chicago 14, Ill.
Churchill Co., Inc., Geo. R. 36
Hingham, Mass.
Circo Equipment Co. 29
130 Central Ave., Clark Twp. (Rahway), N. J.
Clair Manufacturing Co. 114
Olean, N. Y.
Cleveland Process Co. 73
1965 East 57th St., Cleveland 3, Ohio
Clinton Supply Co. 122
112 S. Clinton St., Chicago 6, Ill.
Codman Co., F. L. and J. C.
694 Plain St., Rockland, Mass.
Cohn Mfg. Co., Inc., Sigmund 107
121 S. Columbus Ave., Mt. Vernon, N. Y.
Conversion Chemical Corp. 92
98 E. Main St., Rockville, Conn.
Cowles Chemical Co. 87, 95, 103
7016 Euclid Ave., Cleveland 3, Ohio
Crown Rheostat & Supply Co. 15
3465 N. Kimball Ave., Chicago 18, Ill.

D

Dalic Metachemical, Ltd.
121 Leicester Ave., Toronto 18, Canada
Davies Supply & Mfg. Co.
4160 Meramec St., St. Louis 16, Mo.
Davis-K Products Co. 34
135 W. 29 St., New York, N. Y.
Diamond Alkali Co.
300 Union Commerce Bldg., Cleveland 14, Ohio
Dixon Rippel, Inc.
Kingston, N. Y.
Dow Chemical Company, The 40
Midland, Michigan
Du-Lite Chemical Corp. 101
Middletown, Conn.
Du Pont de Nemours & Co., E. I.
Wilmington, Del.

E

Electronic Rectifiers, Inc. 113
2102 Spann Ave., Indianapolis 3, Ind.
Enthone, Inc. 3
442 Elm St., New Haven, Conn.

F

Federated Metals Div., American Smelting & Refining Co. 93
120 Broadway, New York 5, N. Y.
Formax Corp.
3171 Bellevue, Detroit 7, Mich.
Frank, Paul
118 E. 28th St., New York 16, N. Y.
Fulton Asphalt Co. 114
165 W. Wacker Dr., Chicago 1, Ill.
Fusion Metal Coating Co.
25493 W. 8 Mile Road, Detroit 19, Mich.

G

G. S. Equipment Co. 43
5317 St. Clair Ave., Cleveland 14, Ohio
General Electric Co.
Schenectady 5, N. Y.
Glo-Quartz Electric Heater Co., Inc.
37934 Elm St., Willoughby, Ohio
Graver Water Conditioning Co.
216 W. 14th St., New York 11, N. Y.
Guaranteed Buff Co., Inc.
20 Vandam St., New York 13, N. Y.
Gumm Chemical Co., Inc., Frederick Inside Front Cover
538-542 Forest St., Kearny, N. J.

H

H & S Equipment & Sales Co. 123
483 Keap St., Brooklyn 11, N. Y.
Hamilton Emery & Corundum Co. 120
Chester, Mass.
Hammond Machinery Builders, Inc. 85, 99
1601 Douglas Ave., Kalamazoo 54, Mich.
Handy & Harman 90
82 Fulton St., New York 38, N. Y.
Hanson-Van Winkle-Munning Co. 34A-D, 79
Matawan, N. J.
Harrison & Co., Inc.
487 Groveland St., Haverhill, Mass.
Harshaw Chemical Co., The 16
1945 E. 97th St., Cleveland 6, Ohio
Hartford Steel Ball Co. 108
489 New Park Ave., Hartford 6, Conn.
Henderson Bros. Co.
133 S. Leonard St., Waterbury, Conn.
Hill Acme Co. 24
1209 W. 65th St., Cleveland 2, Ohio
Holland & Sons, Inc., J. 116
475 Keap St., Brooklyn 11, N. Y.
Hull & Co., R. O.
1303 Parsons Ct., Rocky River 16, Ohio

I

Illinois Water Treatment Co. 36
836 Cedar St., Rockford, Ill.
Industrial Filter & Pump Mfg. Co. 82
5906 Ogden Ave., Chicago 50, Ill.
Industrial Instruments, Inc.
89 Commerce Rd., Cedar Grove, N. J.
Infilco, Inc. 18
912 S. Campbell Ave., Tucson, Ariz.
International Rectifier Corp.
1521 E. Grand Ave., El Segundo, Calif.
International Rustproof Corp. 116
12507 Plover Ave., Cleveland 7, Ohio
Iritox Chemical Co. 117
5 Union Sq. West, New York 3, N. Y.

J

Jelco Finishing Equipment Corp. 110
153 E. 26th St., New York 10, N. Y.
Joe-D Buff Co.
Sandwich, Ill.

K

Kaykor Industries 75
4400 Broad St., Yardville, N. J.
Keystone Chromium Corp.
1095 Niagara St., Buffalo, N. Y.
Klem Chemicals, Inc.
14401 Lanson Ave., Dearborn, Mich.
Kocour Company 91
4801 S. St. Louis Ave., Chicago 32, Ill.
Kosmos Electro-Finishing Research
13 Valley St., Belleville 9, N. J.
Kushner, Joseph B. 120
Stroudsburg, Pa.

L

Land, Inc., L. J. 123
146-148 Grand St., New York 13, N. Y.
Lasalco, Inc. 17
2818-38 Lasalle St., St. Louis 4, Mo.
Lea Mfg. Co. 74A
16 Cherry Ave., Waterbury 86, Conn.
Lea-Michigan, Inc.
14066 Stansbury Ave., Detroit 27, Mich.
Lea-Ronal, Inc. 74B
139-20 109th Ave., Jamaica 35, N. Y.
L'Hommedieu & Sons Co., Chas. F. 5
4521 Ogden Ave., Chicago, Ill.

M

MacDermid, Incorporated Back Cover
Waterbury 20, Conn.
Magnus Chemical Co. 80
11 South Ave., Garwood, N. J.
Manhattan Rubber Div., Raybestos-Manhattan, Inc. 98
6 Willett St., Passaic, N. J.
Marlane Development Co., Inc.
153 E. 26th St., New York 10, N. Y.
Matheu Tool Works
2426B N. Clybourn, Chicago 14, Ill.
McAleer Manufacturing Corp. 109
101 S. Waterman Ave., Detroit 17, Mich.
Metal & Thermit Corp. 96
100 E. 42nd St., New York 17, N. Y.
Michigan Buff Co. 122
3503 Gaylord Ave., Detroit 12, Mich.
Michigan Chrome & Chemical Co. 6
8613 Grinnell Ave., Detroit 13, Mich.
Minnesota Mining & Mfg. Co.
900 Fauquier Ave., St. Paul 6, Minn.
Mitchell Bradford Chemical Co. 38
Wampus Lane, Milford, Conn.
Motor Repair & Mfg. Co., The 122
1555 Hamilton Ave., Cleveland 14, Ohio
Murray-Way Corp. 21
P. O. Box 180, Maple Rd. E., Birmingham, Mich.
Mutual Chemical Div., Allied Chemical & Dye Corp. 10
99 Park Ave., New York 16, N. Y.

N

Naraco Group
National Aluminate Corp. 74
6297 W. 66th Place, Chicago 38, Ill.
National Research Corp. 28
Charlemont St., Newton Highlands 61, Mass.
National Sherardizing & Machine Co., Inc. 121
Hartford, Conn.
Niagara Alkali Co. 35
60 E. 42nd St., New York 17, N. Y.
Northwest Chemical Co.
9310 Roselawn Ave., Detroit 4, Mich.
Norton Co. 19
1 New Bond St., Worcester 6, Mass.

O

Oakite Products, Inc. 4
18 Rector St., New York 6, N. Y.

P

Packer Machine Co. 22
Center St., Meriden, Conn.
Pennsylvania Salt Mfg. Co. 26
3 Penn Center Plaza, Philadelphia 2, Pa.
Permutit Co., The 31
330 W. 42nd St., New York 36, N. Y.
Pesco Plating Equipment Corp. 123
75 Wythe Ave., Brooklyn 11, N. Y.
Pfizer & Co., Chas.
630 Flushing Ave., Brooklyn 6, N. Y.
Phelps Dodge Refining Corp. 86
300 Park Ave., New York 22, N. Y.
Phoenix Abrasive & Chemical Co. 115
657 Berriman St., Brooklyn 8, N. Y.
Platers Research Corp.
59 E. 4th St., New York 3, N. Y.
Powers Regulator Co., The 81
3400 Oakton St., Skokie, Ill.
Promat Div., Poor & Co. 8
851 S. Market St., Waukegan, Ill.

R

Rampe Manufacturing Co.
14915 Woodworth Ave., Cleveland 10 Ohio
Rapid Electric Co. 9
2891 Middletown Road, Bronx 61, N. Y.
Raybestos-Manhattan, Inc., Manhattan Rubber Div. 98
6 Willett St., Passaic, N. J.
Rhodes & Co., James H.
157 W. Hubbard St., Chicago 10, Ill.
Richardson Allen Corp. 32
39-15 Main St. Flushing, N. Y.
Roto Finish Co
3706 Milham Rd., Kalamazoo Mich.

S

Saran Lined Pipe Co. 23
2415 Burdette Ave., Ferndale 20, Mich
Sarco Co., Inc. 27
350 Fifth Ave., New York 1, N. Y.
Schaffner Mfg. Co. 13
Schaffner Center, Emsworth, Pittsburgh 2, Pa
Schori Process Div., FerroCo Corp. 42
8-11 43rd Rd., Long Island City 1, N. Y.
Sel Rex Precious Metals, Inc.
229 Main St., Belleville 9, N. J.
Sethco Mfg. Co. 104
74 Willoughby St., Brooklyn, N. Y
Siefen Co., J. J. 106
5643 Lauderdale, Detroit 9, Mich
Simonds Abrasive Co.
Philadelphia 37, Penna.
Smoothex, Inc.
10705 Briggs Rd., Cleveland 11, Ohio
Sommers Bros. Mfg. Co. 121
3439 No. Broadway, St. Louis 7, Mo.
Sparkler Mfg. Co.
Mundelein, Ill.
Special Chemicals Corp.
100 S. Water St., Ossining, N. Y.
Speed-D-Burr Corp.
3613-A San Fernando Rd., Glendale 4, Calif.
Stainless Steel Corp.
Ohio Edison Bldg., Youngstown, Ohio
Stanley Chemical Co.
81 Berlin St., E. Berlin, Conn.
Stauffer Chemical Co.
380 Madison Ave., New York 17, N. Y.
Steadfast Industries, Inc.
4731 W. Madison St., Chicago 44, Ill.
Stevens, Inc., Frederic B. 11
Detroit 16, Mich.
Stokes Machine Co., F. J.
5500 Tabor Rd., Philadelphia 20, Pa.
Storts Welding Co., Inc. 108
38 Stone St., Meriden, Conn.
Stutz Mfg. Co., Geo. A.
4430 Carroll Ave., Chicago 24, Ill.
Sulphur Products Co., Inc. 111
Greensburg 7, Pa.
Swift Industrial Chemical Co. 112
Canton, Conn.
Swiss Colony, Engineering Div.
Monroe, Wis.

T

Tamms Industries, Inc. 112
228 N. LaSalle St., Chicago 1, Ill.
Technic, Inc. 94
39 Snow St., Providence, R. I.
Ther Electric & Machine Works
19 So. Jefferson St., Chicago 6, Ill.
Thermo-Panel Div., Dean Products, Inc. 111
1042 Dean St., Brooklyn 38, N. Y.
True-Brite Chemical Products 106
P. O. Box 31, Oakville, Conn.

U

Udylite Corp., The 88, 89
Detroit 11, Mich.
Unit Process Assemblies, Inc. 118
75 East 4th St., New York, N. Y.
United Chromium Div., Metal & Thermit Corp. 46
100 East 42nd St., New York 17, N. Y.
U. S. Galvanizing & Plating Equipment Corp. 44
31 Heyward St., Brooklyn, N. Y.
U. S. Stoneware Co. 33
Akron 9, Ohio
Univertical Foundry & Machine Co. 121
14841 Meyers Rd., Detroit 27, Mich.

W

Wagner Brothers, Inc. 119
418 Midland, Detroit 3, Mich.
Walker Div., Norma-Hoffman Bearings Corp. 117
Stamford, Conn.
Wallace & Tiernan Co., Inc. 20
25 Main St., Belleville 9, N. J.
Wolverine Metal Co. 118
6500 E. Robinwood Ave., Detroit 34, Mich.
Worklon, Inc.
253 W. 28th St., New York 1, N. Y.
Wyandotte Chemicals Corp.
Wyandotte, Mich.

Z

Zialite Corp. 118
92 Grove St., Worcester 5, Mass.

EQUIPMENT and SUPPLIES ADVERTISED

in this Issue

•

A handy reference list of specific items; the number refers to the page of a manufacturer's advertisement. When writing to these firms, we would appreciate your mentioning our publication.

•

A

Abrasives 112, 120
Abrasive Belt Machines 2-, 85, 119
Acidproof Floors 114
Acid Resistant Pipe 23
Alloy Anodes 16, 88, 93, 96
Aluminum Etch 3
Aluminum Sealer 100
Anode Bags 16, 110
Anodizing Equipment 11
Asphalt Floors 114
Automatic Plating Equipment 11, 17, 44, 89, 121
Automatic Polishing Machines 12, 21, 22, 119
Automatic Vapor Degreaser 7, 29

B

Backstand Idler 5
Balls, Tumbling 92, 108
Barrel Finishing Compounds 4, 14, 19, 37
Barrel Plating Equipment 43, 44, 109
Black Oxide Finishes 101, 112
Boric Acid 16
Brass Plating Solutions 34A, 74B, 106
Brighteners 46, 83, 93, 106, 110, 111, 118
Bronze Plating 34A, 96
Buffs 5, 36, 39, 101, 110, 121
Burnishing Shapes 92, 108

C

Cadmium Anodes 16, 93
Cadmium Fluoborate 16
Cadmium Oxide 16
Chromic Acid 10, 16, 97
Chromium Plating Process 46
Cleaners Inside Front Cover, 4, 26 35, 40, 80, 87, 95, 103
Coated Abrasives 19
Coils, Panel Type 111
Compositions 5, 13, 34A, 72, 74A, 102 109, 115, 120, 121
Contact Wheels 105
Contract Lead Lining 108
Conversion Coatings 8, 34A, 83, 92, 100, 116
Conveyors 34D
Copper Anodes 16, 46, 88, 93, 121
Copper Cyanide 16, 110, 117
Copper Plating Process 34A, 46, Back Cover
Copper Sulfate 16, 86
Crocks 34D, 42

D

Deburring Equipment 15, 22, 99, 119
Degreasing Solvent 7, 34D
Diaphragm Systems 30
Ducts 42

E

Emery 120
Exhaust Fans 34D

F

Filters 34D, 82, 84, 104, Inside Back Cover

G

Generators 34D, 41, 44, 79
Germanium Rectifiers 9
Gloves, Platers 34D
Gold Plating Solutions 34, 94

H

Heating Coils 34D, 73
Hose 34D

I

Immersion Heaters 73
Ion Exchange Equipment 18, 20, 31, 36, 74

L

Lathes 5, 34D, 110
Lead Anodes 16, 88, 93
Lead Work 108
Lining Materials 6, 30, 33, 42, 75, 98, 108
Liquid Buffing Compositions 34D, 106, 109

M

Moisture Extractor Equipment 34D

N

Nickel Anodes 117, 118, 121
Nickel Carbonate 16, 117
Nickel Chloride 16, 117
Nickel Plating Process 16, 34A
Nickel Sulfate 86, 93, 117

P

Pails, Rubber 34D
Periodic Reverse Units 34A, 118
Phosphate Cleaners Inside Front Cover
Plastic Lined Pipe 23
Plastic Tanks 42
Plating Equipment 11, 34D, 43, 44, 89 109, 116, 121
Plating Racks 25
Plating School 120
Potassium Bichromate 10
Proprietary Plating Processes 8, 16, 34A 46, 96, 106, 118, Back Cover
Purification Supplies 34D

R

Rack Assemblies 25
Rack Coating Material 6
Rectifiers 9, 32, 34D, 44, 113, 117
Rhodium Solutions 34, 45, 94, 107
Rochelle Salts 16, Back Cover
Rubber Lined Tanks 30, 34D, 98, 110
Rubber Rollers 105

S

Sherardizing 121
Silver Anodes 90
Silver Cyanide 16
Sodium Bichromate 10
Sodium Cyanide 16
Sodium Stannate 16
Spray Buffing Equipment 106
Spray Depressant 34D, 88
Stannous Sulfate 16
Strippers 38, 115, 116
Surface Finishing Machine 114

T

Tape 34D
Temperature Regulators 27, 34D, 81
Thickness Gauges 34, 91
Tin Anodes 16, 88, 93, 96
Tin Fluoborate 16
Tumbling Abrasive 19
Tumbling Barrels 5, 15, 37, 92, 108

U

Ultrasonic Equipment 29

V

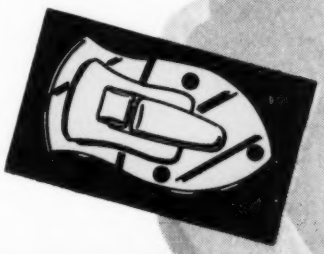
Vacuum Plating Equipment 28

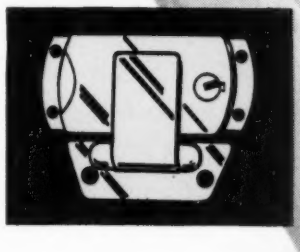
W

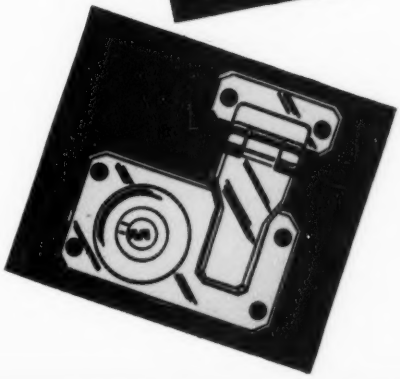
Washers 29, 80, 100
Waste Treatment Equipment 18, 20, 36, 74

Z

Zinc Anodes 16, 93
Zinc Coatings 116
Zinc Cyanide 16, 88, 110
Zinc Fluoborate 16
Zinc Sulfate 16, 88







Sel-Rex FILTER HELPS PRESTO-LOCK GET FINE QUALITY FINISH ON THEIR FAMOUS LUGGAGE HARDWARE

The Presto-Lock Company produces the "Aristocrat of all luggage hardware." This reputation is earned by the blending of engineering skill and the very best of equipment. We are proud that a SEL-REX FILTER was selected for filtration of their plating baths — so vital to fine quality electroplating.

SEL-REX "Double Duty" FILTERS can be completely cleaned in 15 minutes or less. Backwashing, if preferred, is simply a matter of turning two valves. A new stainless steel mesh filter element is interchangeable with a porous stone for "double duty" — double value. Portable, mobile or stationary models from 250 to 18,000 GPH capacities. Larger units built to specifications.

You get super-efficient filtration and lower operating costs with SEL-REX. See for yourself—send for complete literature today.

BART-MESSING CORPORATION

229 MAIN STREET • BELLEVILLE 9, N. J.